United States Department of Agriculture

Targhee National Forest Lynx Analysis Units

Draft Environmental Impact Statement

Forest Service Caribou-Targhee National Forest November 2015

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Draft Environmental Impact Statement
Caribou-Targhee National Forest

Dear Forest User:

The Caribou-Targhee National Forest (C-TNF) is inviting comments on the Targhee National Forest Lynx Analysis Units Draft Environmental Impact Statement (DEIS). The Notice of Intent for this project was published in the Federal Register on March 22, 2013 under the project title "Amendment to the Targhee Revised Forest Plan – Canada Lynx Habitat". The project was renamed as the "Targhee National Forest Lynx Analysis Units" to more accurately reflect the revised proposed action of the DEIS. The C-TNF is proposing to make an administrative decision to establish the boundaries (Lynx Analysis Units or LAUs[1]) that will be used to analyze the effects site-specific projects may have on Canada Lynx.

This programmatic Environmental Impact Statement discloses the effects of establishing LAUs on the Targhee National Forest. However, project-level environmental analysis will still be needed for specific proposals to implement the direction provided by the 1997 Revised Forest Plan for the Targhee National Forest, as amended by the 2007 Northern Rockies Lynx Management Direction.

The Forest Supervisor is the Responsible Official for this analysis. A decision on this proposal is anticipated in 2016.

How to Comment and Timeframe

Public comment on this analysis is pursuant to the pre-decisional administrative review process described at 36 CFR 218, Subpart A and B. Public comments will be accepted for 45 calendar days following the publication of the notice of availability (NOA) of the DEIS in the Federal Register. If the comment period would end on a Saturday, Sunday, or federal holiday comments will be accepted until the end of the next federal working day. No comments will be accepted after the 45 day comment period ends. Only those who comment and meet all the requirements contained in 36 CFR 218.25(a)(3) will have standing to object to the project during the 45 day objection period, which will occur following the distribution of the Final Environmental Impact Statement and draft Record of Decision.

Comments submitted in response to this solicitation must meet the definition of "specific written comments" as defined at 36 CFR 218.2, particularly "...specific written comments should be within the scope of the proposed action, have a direct relationship to the proposed action, and must include supporting reasons for the responsible official to consider." Acceptable formats for electronic comments are text or html email, Adobe portable document format (.pdf), and formats viewable in Microsoft Office applications (e.g. .txt, .rtf, .doc). Please note in the subject line that the comments are for the "Targhee National Forest Lynx Analysis Units.

[1] By definition, an LAU is a unit for which the effect of a project would be analyzed (NRLMD Rod, p. 12).

Hand delivered written comments will be accepted at the Caribou-Targhee National Forest Supervisors Office between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, except for Federal holidays. It is the responsibility of persons providing comments to submit them by the close of the comment period. Only those who submit timely and specific written comment will have eligibility (36 CFR 218.25) to file an objection under 36 CFR 218.8. For objection eligibility, each individual or representative from each entity submitting timely and specific written comments must either sign the comment or verify identity upon request. Individuals and organizations wishing to be eligible to object must meet the information requirements in 36 CFR 218.25(a)(3). Names and contact information submitted with comments will become part of the public record and may be released under the Freedom of Information Act.

Written comments may be submitted by postal service mail, email, or facsimile to:

Doug Herzog, Forest Planner
Caribou-Targhee National Forest
1405 Hollipark Drive
Idaho Falls, ID 83401

Fax: 208-557-5826

Email: **comments-intermtn-caribou-targhee@fs.fed.us**

If you have questions about this project, please contact Doug Herzog at 208-557-5763 or robertdherzog@fs.fed.us.

Sincerely,

GARTH SMELSER
Forest Supervisor

Summary

The Caribou-Targhee National Forest proposes to make an administrative decision establishing the boundaries (Lynx Analysis Units or LAUs) that will be used to analyze the effects site-specific projects may have on Canada lynx.[2] This programmatic analysis and subsequent decision, although administrative in nature, responds to a 2012 United States District Court for the District of Idaho Memorandum Decision and Order which held "…the [Split Creek Precommercial Thinning Project] environmental assessment and the Finding of No Significant Impact were procedurally defective because they relied upon a document, [the Targhee NF 2005 LAU Map], that itself should have been, but was not vetted under NEPA."[3] The Court further stated:

> "Although the [Targhee NF 2005 LAU Map] was subjected to public comment prior to the approval of the [Split Creek Precommerical Thinning Project], the map was never subjected to independent NEPA review, which would have required an analysis of the potential affects the removal of LAUs would have on the lynx, its habitat, and the habitat of snowshoe hare. Such analysis is absent in this case. The absence of such analysis violates NEPA's procedural requirements and the Ninth Circuit's decision in Kern[4]."

This programmatic Environmental Impact Statement will disclose the effects of establishing LAUs on the Targhee National Forest. The resulting decision of this analysis will set a course of action for the management of Canada lynx on the Targhee National Forest for the next 15-25 years. However, project-level environmental analysis will still be needed for specific proposals to implement the direction provided by the 1997 Revised Forest Plan for the Targhee National Forest, as amended by the 2007 Northern Rockies Lynx Management Direction.

Purpose and Need

The purpose and need of this action is to complete an analysis of the affects applying LAU boundaries, consistent with the NRLMD, to the Targhee NF would have on lynx, its habitat, and the habitat of snowshoe hare.

This action responds to the goals and objectives outlined in the NRLMD and the 1997 Revised Forest Plan for the Targhee NF (pg. A-31), and will provide compliance with NEPA (42 U.S.C. § 4321), Forest Service national guidance (FSM 2600), and the Endangered Species Act (16 U.S.C. §1536).

[2] By definition, an LAU is a landscape unit that approximates the size of a female lynx annual home range (appropriate to the Geographic Area) and encompasses all seasonal habitats. These may also contain areas of non-lynx habitat, such as open meadows, especially in mountainous regions. An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant (LCAS 3rd Edition).

[3] Native Ecosystems Council & Alliance for the Wild Rockies v. U.S. Forest Serv. ex rel. Davey, 866 F. Supp. 2d 1209 (D. Idaho 2012).

[4] Kern v. U.S. Bureau of Land Management, 284 F.3d 1062, 1066 (9th Cir. 2002).

Public Involvement

The Notice of Intent (NOI) for this proposed action was published in the Federal Register on March 22, 2013 under the project title "Amendment to the Targhee Revised Forest Plan – Canada Lynx Habitat". The project was renamed as the "Targhee National Forest Lynx Analysis Units" to more accurately reflect the revised proposed action of the DEIS. The NOI opened a 30-day public scoping comment period, beginning March 22, 2013, on the proposal and asked for comment on preliminary issues, topics, and the preliminary proposed action. Additionally, a letter and scoping document was mailed to groups and individuals who previously expressed interest in the proposed action.

The C-TNF received ten comment letters in response to the 30-day public scoping period. Using the comments received from the public and other agencies (see *Issues* section), the interdisciplinary team developed a list of issues to address in this document.

Issues

The Forest Service identified the following issue as the only significant issued following scoping:

ISSUE 1: LAU delineations affect lynx, its habitat, and the habitat of snowshoe hare.

Two indicators, and relative measures, were established to evaluate this identified issue.

Indicator 1: *Changes in the amount of vegetation (primary and secondary vegetation) that contributes to lynx habitat*[5] *within LAUs.*

Rational for Indicator 1: The NRLMD standards and guidelines contribute to the conservation and recovery of Canada lynx. If vegetation that contributes to lynx habitat is not within a LAU these standards and guidelines will not be applied and adverse effects could occur to lynx, its habitat, and the habitat of snowshoe hare.

[5] Lynx habitat: lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consist of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Dougals-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forest do not provide lynx habitat (LCAS 2nd Edition, NRLMD ROD 2007); or Boreal forest with gentle rolling topography, dense horizontal cover, deep snow, and moderate to high (>0.5 hares/ha [0.2 hares/ac]) snowshoe hare densities. In the northeastern United States, lynx habitat includes coniferous and mixed-coniferous/deciduous forests dominated by white, black, and red spruce, balsam fir, pine, norther white cedar, hemlock, sugar maple, aspen, and paper birch. In Minnesota, lynx habitat includes coniferous and mixed-coniferous/deciduous vegetation types dominated by pine, balsam fir, black and white spruce, northern white cedar, tamarack, aspen, and paper birch. In the western United States, forest cover types dominated by Engelmann spruce, subalpine fir and lodgepole pine provide habitat for lynx (LCAS 3rd Edition).

Measure for Indicator 1: The amount of mapped primary and secondary vegetation within LAUs.

Indicator 2: *LAUs are delineated consistent with the NRLMD FEIS and the Lynx Conservation Assessment and Strategy (LCAS) 2nd Edition.*

Rational for Indicator 2: If LAUs are delineated consistent with the NRLMD FEIS and LCAS 2nd ed. the NRLMD standards and guidelines that contribute to the conservation of lynx would be implemented appropriately.

Measure for Indicator 2: Percentage of all LAUs that are delineated consistent with the NRLMD FEIS and LCAS.

Alternatives

The FS developed two alternatives, including the No Action and Proposed Action alternatives, in response to issues raised during internal and external scoping and which meet the Purpose and Need of this analysis. The alternatives being considered in detail, through the effects analysis of this programmatic EIS, display which LAU boundary configuration(s) best meet the intent of the criteria and procedures established in the Northern Rockies Lynx Management Direction (NRLMD) and the Lynx Conservation Assessment and Strategy (LCAS). Further, the alternatives will show the variable programmatic effects each LAU boundary configuration will have on lynx, its habitat, and the habitat of snowshoe hare.

Alternative 1 – No Action

Under the No Action alternative the Targhee NF does not have LAUs that have been vetted or analyzed under NEPA, as required by the Court Order. However, primary and secondary vegetation have been mapped and identified on the Targhee NF according to the direction and criteria provided by NRLMD and LCAS.

Alternative 2 – Proposed Action

The Proposed Action involves a programmatic decision to use the Targhee NF 2014 LAU boundaries (as depicted on the Targhee National Forest 2014 LAU Map) for all future projects to disclose project-level effects to lynx, its habitat, and the habitat of snowshoe hare. Twenty-four LAUs are delineated on the Targhee NF 2014 LAU Map, encompassing a total of 1,133,575 acres of FS managed lands. These LAUs contain 474,440 acres of mapped primary vegetation[6] and 40,701 acres of mapped secondary vegetation[7], which for future project-level analysis will be considered mapped lynx habitat.

[6] Primary vegetation: subalpine fir habitat types dominated by cover types of spruce/fir, Douglas-fir, and seral lodgepole pine (NRLMD EIS Appendix B 2007).

[7] Secondary vegetation: cool, moist habitat types (e.g., some Douglas-fir, grand-fir) that may contribute to lynx habitat where they are intermingled with and immediately adjacent to primary vegetation (NRLMD EIS Appendix B 2007).

Summary of Effects

The following table summarizes the differences and effects of each alternative relative to the issue indicators and measures. As shown below, the 2014 LAU boundaries encompass the most acres of lynx habitat (primary and secondary) and 100% of the 2014 LAU boundaries are delineated consistent with the criteria and procedures in the NRLMD and LCAS.

Alternatives	**Issue Indicators**	
	Acres of Lynx Habitat (Primary and Secondary Vegetation within LAU boundaries)	**Number and Percent of LAUs delineated consistent with the criteria and procedures in the NRLMD and LCAS**
Alternative 1: No Action	0 *(No LAUs have been vetted through NEPA)*	0 *(No LAUs have been vetted through NEPA)*
Alternative 2: Proposed Action - 2014 LAU Boundaries	515,141	24 of 24: 100%

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Chapter 1. Purpose of and Need for Action

Introduction and Document Structure

The Forest Service has prepared this environmental impact statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This environmental impact statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives.

Chapter 1: Purpose and Need for Action: The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that Purpose and Need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2: Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter 3: Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.

Chapter 4: Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Index: The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at Caribou-Targhee National Forest Supervisor's Office, 1405 Hollipark Drive, Idaho Falls, Idaho 83401.

Background

In May 2011, a lawsuit was filed against the Forest Service (FS) challenging the approval of the Split Creek Project and the Forest Services' use of the Targhee National Forest (NF) 2005 Lynx Analysis Unit (LAU) Map. In 2012, the United States District Court for the District of Idaho issued a Memorandum Decision and Order (hereafter referred to as "Court Order") which held "…the [Split Creek Precommercial Thinning Project] environmental assessment and the Finding of No Significant Impact were

procedurally defective because they relied upon a document, [the Targhee NF 2005 LAU Map], that itself should have been, but was not vetted under NEPA."[8]

The Court stated:

> "Although the [Targhee NF 2005 LAU Map] was subjected to public comment prior to the approval of the [Split Creek Precommerical Thinning Project], the map was never subjected to independent NEPA review, which would have required an analysis of the potential affects the removal of LAUs would have on the lynx, its habitat, and the habitat of snowshoe hare. Such analysis is absent in this case. The absence of such analysis violates NEPA's procedural requirements and the Ninth Circuit's decision in Kern[9]."

The 2012 Court Order remanded the Split Creek Precommercial Thinning Project Decision Notice and Finding of No Significant Impact to the FS to further evaluate the effects delineating LAUs has on lynx, its habitat, and the habitat of snowshoe hare. The Court Order provided the following summary of the factual and procedural background leading up the June 6, 2012 decision:

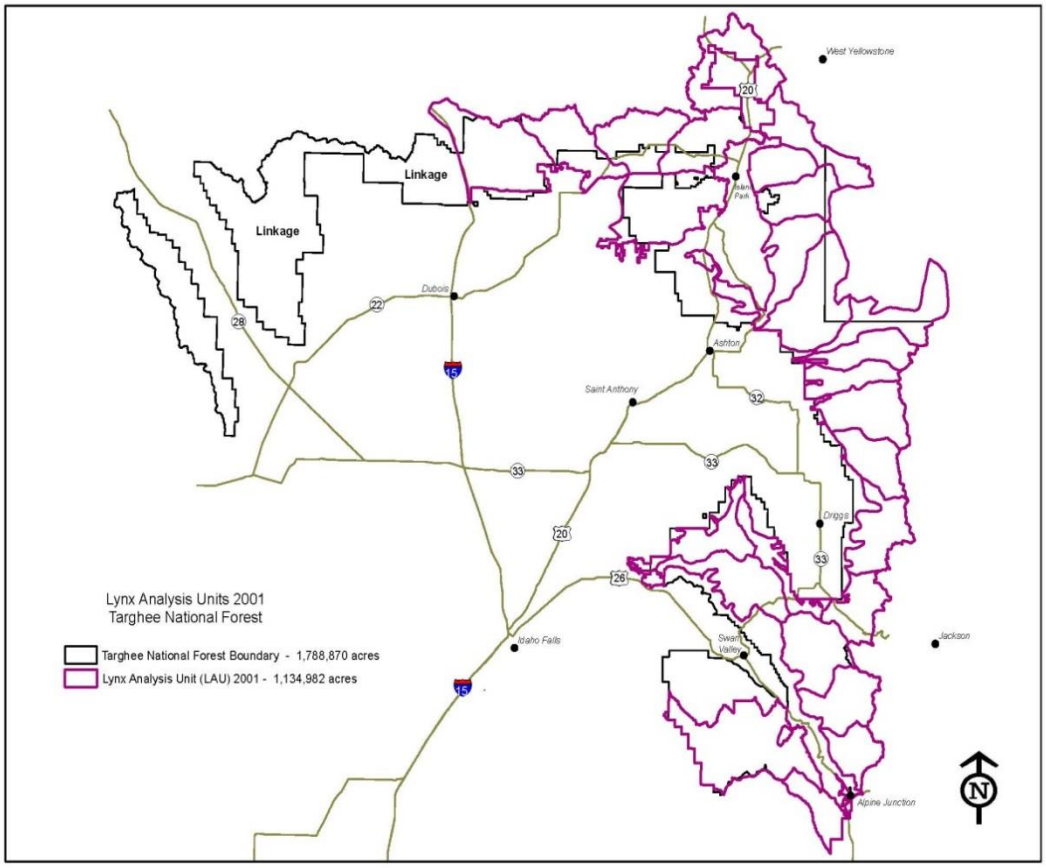
On March 24, 2000, the U.S. Fish and Wildlife Service (FWS) added the Canada lynx (*Lynx canadensis*) to the list of threatened species under the Endangered Species Act. 65 Fed. Reg. 16052-1, 2000 WL 299328. Following nearly a decade of analysis, the agency determined that the lynx population of the continental United States was threatened by "the lack of guidance for conservation of lynx and snowshoe hare habitat in the National Forest Land and Resource Plans." (NRLMD ROD, p. 1) The FWS concluded that "it is imperative that lynx habitat and habitat for lynx prey [primarily snowshoe hare] be maintained and conserved on Federal lands." 65 Fed. Reg. 16051-01.

In 2000, an interagency lynx biology team, which consisted of biologists from the FS, the FWS, the Bureau of Land Management, and the National Park Service, developed the Canada Lynx Conservation and Assessment and Strategy ("LCAS") as an interim and guiding conservation strategy for lynx on federal lands. (Ruediger et al. 2000). The LCAS required the FS and the FWS to delineate LAUs "upon which direct, indirect, and cumulative effects" from site-specific projects could be analyzed. (Ruediger et al. 2000) "An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles[,]" (NRLMD FEIS, p. 370), and must contain "at least 10 square miles of primary [lynx habitat to support reproduction and survival]." (Ruediger et al. 2000 and ILBT 2013) According to the LCAS, LAUs were "not intended to depict actual lynx home ranges, but are intended to provide analysis units of the appropriate scale with which to begin the analysis of potential direct and indirect effects of projects or activities on individual lynx, and to monitor habitat changes."

[8] Native Ecosystems Council & Alliance for the Wild Rockies v. U.S. Forest Serv. ex rel. Davey, 866 F. Supp. 2d 1209 (D. Idaho 2012).
[9] Kern v. U.S. Bureau of Land Management, 284 F.3d 1062, 1066 (9th Cir. 2002).

In 2001, the FS and the FWS delineated LAUs for the Island Park and Centennial Mountain areas of the Targhee NF.[10] (USDA FS, Split Creek Precommercial Thinning Project BA for Canada Lynx, 2009) This delineation of LAUs is referred to as the Targhee NF 2001 LAU map (see Figure 1.1, Targhee NF 2001 LAU Boundaries). The Targhee NF 2001 LAU map depicts several LAUs within the Targhee NF, encompassing a total of 1,134,779 acres. Within the LAUs, 645,049 acres were considered primary suitable habitat, 126,795 were secondary suitable habitat, 98,554 were primary unsuitable habitat and 8,565 were considered secondary unsuitable habitat. (USDA FS 1999)

Figure 1.1. Targhee National Forest 2001 LAU Boundaries



During this same time period, the Forest Service and the FWS entered into a Lynx Conservation Agreement in the year 2000. The agreement served as a framework for lynx conservation within mapped lynx habitat on national forests and was revised in 2005 and again in 2006 to implement the standards and guidelines in the LCAS until formal management could be implemented.

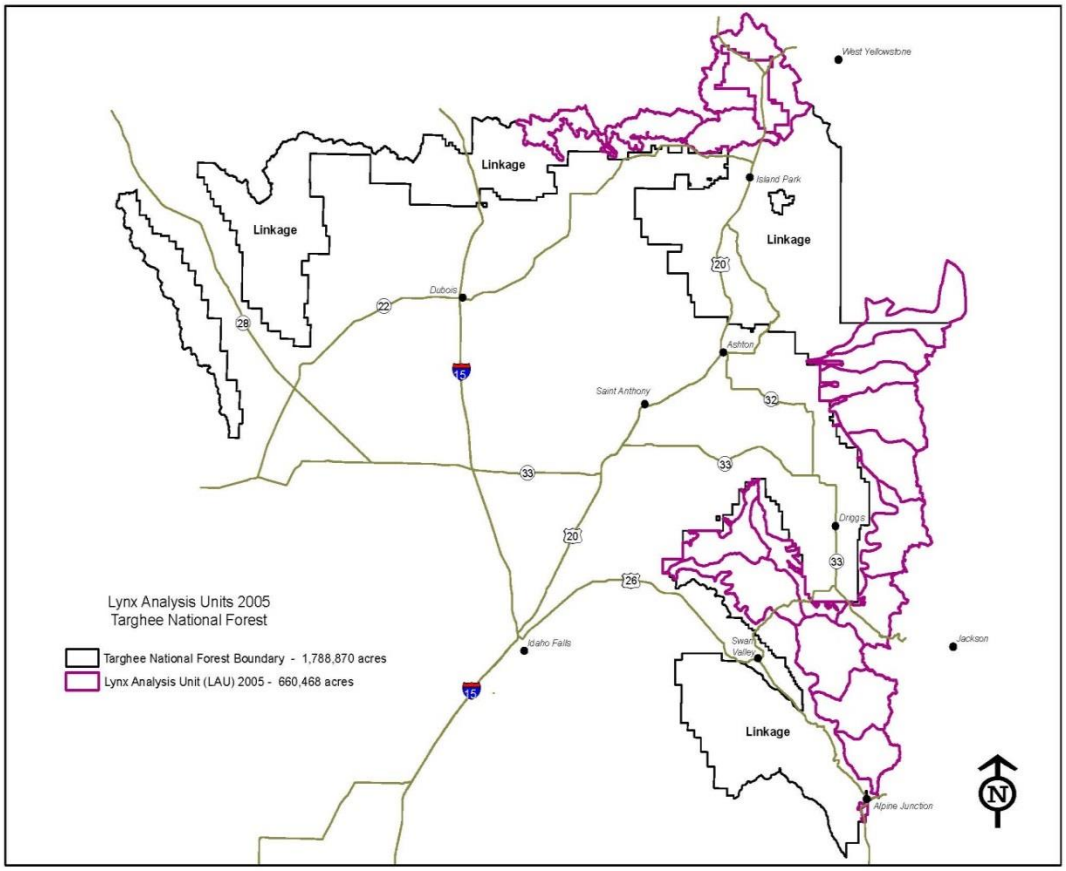
[10] The Project is located in the Island Park area of the C-TNF.

Over the intervening years, new information on primary lynx habitat, snowshoe hare densities, and lynx occurrences became available (USDA FS, Split Creek Precommercial Thinning Project BA for Canada Lynx, 2009). This new information was discussed at interagency meetings in 2001 and 2003 and was documented through several administrative studies completed by the FS in 2004. The new studies suggested that the LAUs delineated in the Island Park and Centennial Mountains were overestimated (USDA FS, Split Creek Precommercial Thinning Project BA for Canada Lynx, 2009).

In 2005, as contemplated by the LCAS, the agencies revised the LAU designations in the Island Park and Centennial Mountain areas. (USDA FS, Split Creek Precommercial Thinning Project BA for Canada Lynx, 2009) According to the FWS, "as new information became available (including information on habitat quality, snowshoe hare studies, and habitat mapping), it became necessary to refine the [original] LAU [delineations]," and in 2005, the FS developed a revised LAU map for the Targhee NF (see Figure 1.2, Targhee NF 2005 LAU Boundaries). In the revision process, the agencies used a habitat model that predicted the probability of moist subalpine fir habitat on the Targhee NF. The habitat model used a topographic methodology (evaluating elevation, slope, soil, etc.) that allowed the agencies to more accurately separate the moist subalpine fir habitat (which the agencies previously found to be primary lynx habitat) from the subalpine fir habitat types[11] that support a dry persistent lodgepole pine community type[12] (which the agencies previously found were not associated with primary lynx habitat). (USDA FS, Split Creek Precommercial Thinning Project BA for Canada Lynx, Attachment 1, 2009.)

[11] Habitat type: an aggregation of all land areas potentially capable of producing similar plant communities at climax (Steele et al 1983).
[12] Community type: a classified plant community distinguished by various criteria, may be seral or climax (Steele et al 1983).

Figure 1.2 Targhee National Forest 2005 LAU Boundaries



When this habitat model was applied to the Island Park and Centennial Mountain areas, the agencies found that the occurrence of moist subalpine fir habitat in the 2001 LAU map had been significantly overestimated. (USDA FS, Split Creek Precommercial Thinning Project BA for Canada Lynx, Attachment 1, 2009) ("estimated occurrence of [moist] subalpine fir habitat type [in the Island Park area] was considerably (>30%) less than previously mapped."). Based on the results of the habitat model, the agencies revised the locations of moist subalpine fir habitat types in the areas and determined that many of the 2001 LAUs, especially in the Island Park area, contained less than the required 10 square miles of moist subalpine fir habitat. Ultimately, the 2001 LAU Map was revised to reflect the new information. Eight LAUs were removed from the 2001 LAU map, based on the new information and modeling results, and the removal was reflected on the 2005 LAU Map.

In 2007, the FS approved the Northern Rockies Lynx Management Direction (NRLMD), which amended the 1997 Targhee Revised Forest Plan (RFP) by incorporating additional management direction relative to Canada lynx and lynx habitat. However, the NRLMD did not identify lynx habitat or LAUs for the Targhee NF. The NRLMD merely advised each forest how to use the best available data in concert with the guidelines and

definitions provided (NRLMD FEIS, Appendix B, p. 439-452) to determine where lynx habitat may be on their forests and to map LAU boundaries.

The NRLMD and the LCAS (ILBT 2013) provides the following definitions, standards, and guidelines for LAUs, lynx habitat, and snowshoe hare habitat:

1. Standard LAU S1: Changes in LAU boundaries shall be based on site-specific habitat information and reviewed by the Forest Service Regional Office (NRLMD ROD, Attachment 1, p. 1).
2. Definition of an LAU: *LAU (Lynx Analysis Unit)* – An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (Ruediger et al. 2000). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant (NRLMD ROD, p. 12).
3. Definition of Lynx Habitat: *Lynx habitat* – Lynx habitat occurs in mesic coniferous forest that experience cold and snowy winters (NRLMD ROD, p. 12). Lynx habitat typically consists of boreal forest with gentle rolling topography, dense horizontal cover, deep snow, and moderate to high (>0.5 hares/ha [0.2 hares/ac]) snowshoe hare densities (ILBT 2013, p.125). In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Douglas-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat (NRLMD ROD, p. 12).
4. Definition of Snowshoe Hare Habitat: *Snowshoe hare habitat* – Boreal and upper montane forests in North America with cold, moderately deep winter snowpack and dense horizontal cover in the understory. During the winter, hares are restricted to areas where young trees or shrubs grow densely (thousands of woody stems per ha) and are tall enough to protrude above the snow during winter, or where numerous overhanging boughs of mature conifer trees touch the snow surface provide cover and browse. Winter snowshoe hare habitat develops primarily in the later phase (15 to 40 years post-disturbance) of stand initiation structural stage and in multi-story mature and old stands (ILBT 2013, p. 127).

In February 2009, the USFWS published the final rule for designation of critical habitat for the contiguous United States Distinct Population Segment (DPS) of the Canada Lynx (USDI FWS 2009b). No critical habitat was designated for Canada lynx anywhere on the Caribou-Targhee National Forest. Also, no critical habitat was designated for Canada lynx along the west boundary of Yellowstone National Park. In September 2014, the USFWS finalized both a revised critical habitat designation for the contiguous US DPS and revised the definition for what constitutes the range of the DPS. Under this revision, no critical habitat was designated for Canada lynx on the Caribou-Targhee National Forest[13].

[13] Revised Canada lynx critical habitat maps can be found at: http://www.fws.gov/mountain-prairie/species/mammals/lynx/index.htm

Figure 1.3 Canada Lynx Critical Habitat Map (http://www.fws.gov/mountain-prairie/species/mammals/lynx/CHFinalRule2014/20140912_Lynx_CH_Final_Rule_Fed_Reg.pdf)

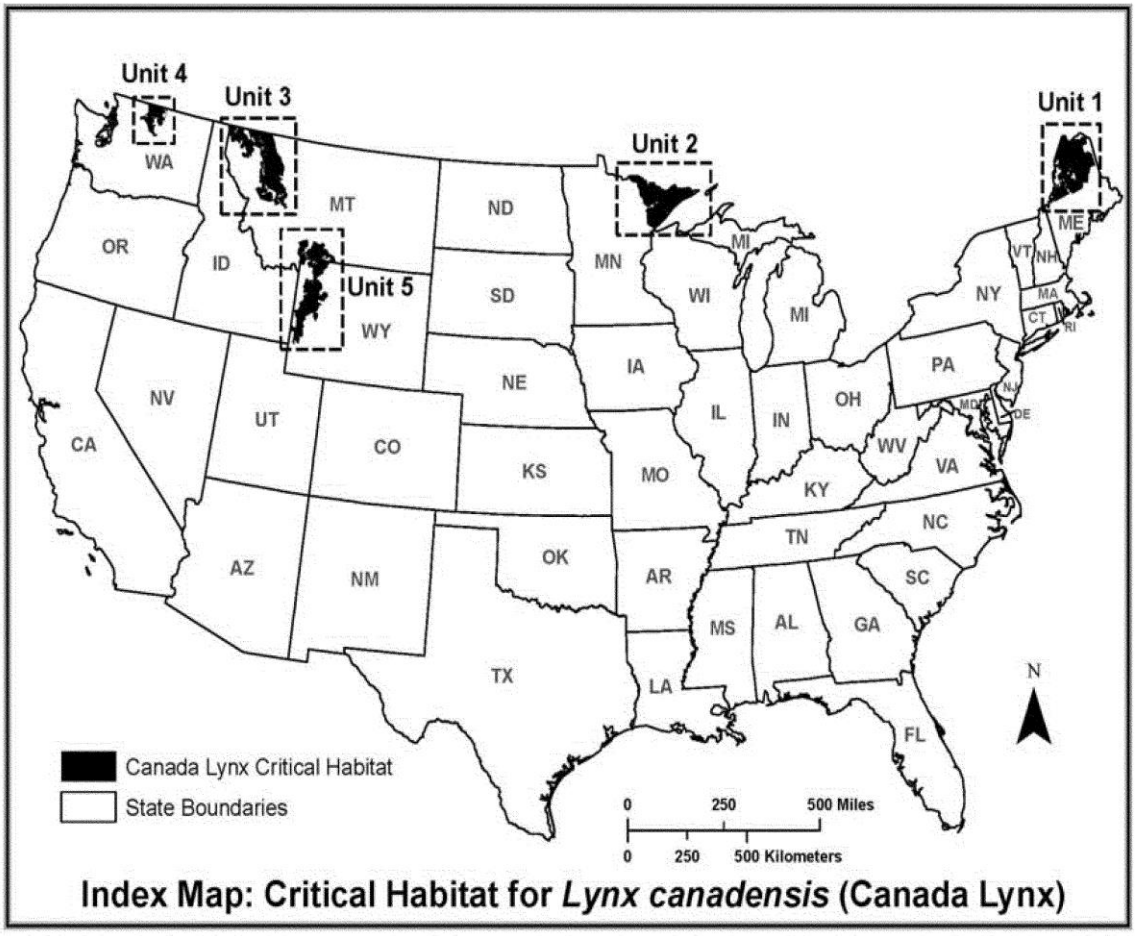
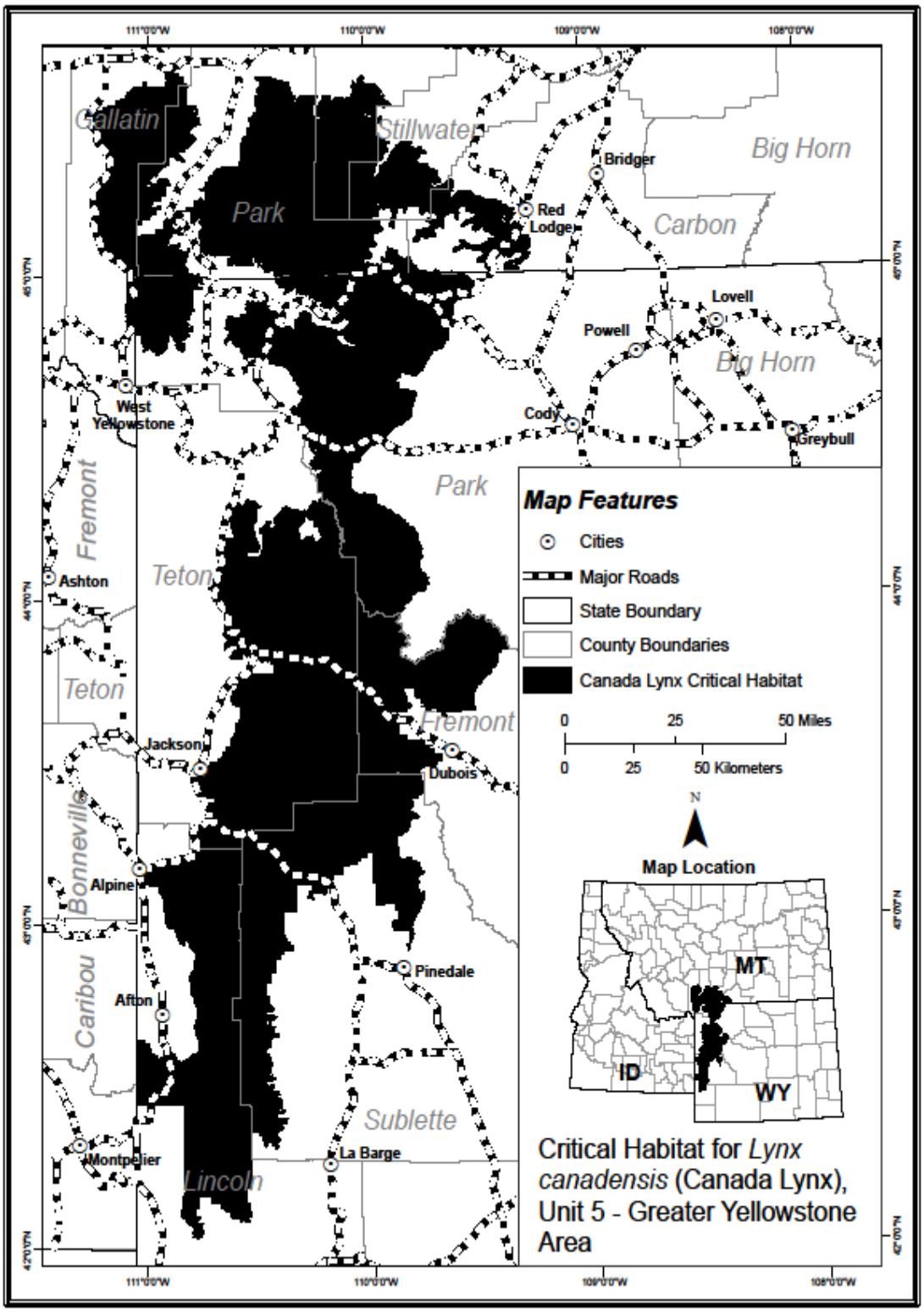


Figure 1.4 Unit 5 (Greater Yellowstone region) Canada Lynx Critical Habitat Map (http://www.fws.gov/mountain-prairie/species/mammals/lynx/CHFinalRule2014/Lynx_CH_Unit5_2014.pdf)



In 2014, the C-TNF again revisited LAU mapping on the Targhee NF and created the Targhee 2014 LAU Map. The Targhee NF 2014 LAU boundaries were delineated and mapped using the criteria and procedures disclosed in the NRLMD. A detailed description of the process used to delineate the Targhee NF 2014 LAUs can be found in Appendix A (Appendix A: Lynx Habitat Mapping Process).

Differences in LAU Mapping Efforts

The primary reason for the differences in the delineation of LAUs is due to the refinement of mapping of vegetation that could contribute to lynx habitat on the Targhee. This includes what constitutes primary vegetation, secondary vegetation, and vegetation not contributing to lynx habitat. Additional understanding of the amount and spatial arrangement of vegetation that contributes to lynx habitat and the use of ungulate winter ranges as defining where adequate snow cover occurs have refined where vegetation that contributes to lynx habitat has been mapped.

A detailed discussion on how each mapping effort (Targhee NF 2001 LAU Map, Targhee NF 2005 LAU Map, and Targhee NF 2014 LAU Map) compares to the criteria outlined in Appendix B of the NRLMD EIS can be found in Chapter 1 below. This details how each mapping process compares to the mapping criteria and discloses the rationale on why each mapping process is different.

In 2001, the first LAU delineation was mapped on the Targhee National Forest in response to the Canada Lynx Conservation Agreement between the U.S. Forest Service and the U.S. Fish and Wildlife Service in 2000. This is known as the Targhee NF 2001 LAU Map. Primary vegetation was mapped based upon the criteria that all subalpine fir habitat types were considered vegetation that contributed to lynx habitat. Some persistent lodgepole pine community types[14] were considered as non-lynx habitat especially in the Island Park Caldera. Ungulate winter ranges were considered as not having adequate snow cover and were excluded as areas that support lynx habitat. Based upon this information LAUs were delineated around what was mapped as primary vegetation at the time.

In 2003, an interagency lynx coordination meeting was held. Several key questions were discussed in defining the attributes of primary vegetation and secondary vegetation. One of the main concerns was subalpine fir habitat types occurring on rhyolitic soils being considered primary vegetation when they support a long time seral[15] (persistent) lodgepole pine community type. One conclusion of the interagency lynx coordination meeting was that these habitat types will not support snowshoe hare densities high enough for suitable forage for lynx. Based upon the considerations it was recommended that it was likely these habitat types would not contribute to lynx habitat. To attain more

[14] Persistent community types: Communities that frequently persist for long periods of time and in some cases appears to be climax (Bradley et al. 1992).
[15] Seral: a species or community that is replaced by another species or community as succession progresses (Steele et al. 1983).

information several administrative studies were conducted to improve the identification of vegetation that contributes to lynx habitat between 2003 and 2005. Based upon the results of these studies several conclusions and recommendations were made: 1) continuous areas of subalpine fir were not evident across the East Plateau and lower elevations in the Centennial Mountains; 2) most subalpine fir habitat types were the dry type for this region and dense forest cover for snowshoe hare would occur only in small patches discontinuously throughout the area; and 3) snowshoe hare abundance was low compared to areas in more continuous habitat.

With the information gained from several administrative studies the 2001 LAU delineations were revised in 2005. This map is known as the Targhee NF 2005 LAU Map. Much of the persistent lodgepole pine types on rhyolitic soils were no longer considered primary vegetation based upon the probability of subalpine fir occurring. Additional remapping of primary vegetation occurred in the Centennial Mountains. Many areas were considered dry habitat types that would not support vegetation that contributes to lynx habitat due to the probability of subalpine fir. Due to this new information and better understanding of primary vegetation, the amount of primary vegetation that was mapped in 2005 significantly decreased from the amount that was previously mapped in 2001. Due to this decrease in mapped primary vegetation some LAUs were removed because they no longer contained enough mapped primary vegetation to satisfy LAU delineation criteria. Other LAUs were re-delineated to adjust for the smaller amounts of primary vegetation than was previously mapped.

In 2012, the Split Creek Precommercial Thinning Project was enjoined due to the 2005 LAU delineations not being vetted through the NEPA process. Following the 2012 court ruling, the C-TNF reevaluated the 2005 LAU delineations. Based on additional information at that time and building upon the information and administrative studies that were conducted for the Targhee NF 2005 LAU Map, the C-TNF determined that vegetation that contributes to lynx habitat would need to be remapped which would likely change LAU delineations. This new mapping effort resulted in the Targhee NF 2014 LAU Map or the Proposed Action. Appendix A (Appendix A: Lynx Habitat Mapping Process) details the mapping process used to develop the Targhee NF 2014 LAU Map. Based upon the results of the McDaniel and McKelvey study of the modeling of subalpine fir presence (McDaniel and McKelvey 2004b), Despain 1990, and Bradley et. al 1992, it was recognized that certain subalpine fir habitat types support a dry persistent lodgepole pine community types which do not provide the habitat characteristics to support snowshoe hare populations to sustain lynx reproduction and survival. Every forest habitat type on the Targhee National Forest was classified into primary, secondary, or dry forest vegetation. Utilizing the TNFEUI, topographic models, and new vegetation delineations, primary and secondary vegetation was mapped. Utilizing new watershed layers LAUs were delineated. Based upon the new delineations and habitat type classification it was not necessary to use ungulate winter ranges as a criteria. New information on adequate patch size of primary vegetation was also utilized and warranted additional LAUs that were not identified in the previous LAU mapping efforts. Currently, the Targhee NF 2014 LAU Map is the best available

information on how LAUs are to be delineated based upon the mapping of primary vegetation.

NRLMD LAU Mapping Criteria

The criteria used to map LAUs have not changed since the creation of the 2001 map. The primary reason for the differences in the delineation of LAUs in 2001, 2005, and 2014 is due to the refinement of mapping vegetation that could contribute to lynx habitat on the Targhee. This includes what constitutes primary vegetation, secondary vegetation, and vegetation not contributing to lynx habitat. Additional understanding of the amount and spatial arrangement of vegetation that contributes to lynx habitat and the use of ungulate winter ranges as defining where adequate snow cover occurs have refined where vegetation that contributes to lynx habitat has been mapped.

The criteria used to map LAUs are outlined in Appendix B of the NRLMD FEIS. The following is a detailed discussion on how each mapping effort (2001, 2005, and 2014 LAU Maps) compares to the criteria outlined in the NRLMD. It provides the rationale on why each mapping effort (2001, 2005, and 2014) resulted in varying LAU configurations.

Criteria 1: Information contained in the Science Team Report (Ruggiero et al. 2000a) provides the starting point for lynx habitat mapping. The outer boundary that should be used for each geographic area is shown in Chapter 8 (McKelvey et al. 2000d): Figs 8.20 for western U.S.

The Targhee NF falls within the geographic area referenced in Chapter 8 of the NRLMD. All the lynx mapping processes (2001, 2005, and 2014) used this criterion to map lynx habitat and delineate LAUs.

Criteria 2: In the western US, lynx occurrences generally are found only above 4,000 feet elevation. Areas below 4,000 feet usually should be excluded.

The Targhee NF ranges from approximately 5,000 feet to 12,000 feet in elevation. It was not necessary in any of the mapping process to use this criterion for mapping lynx habitat or delineating LAUs since the Targhee NF is above 4,000 feet elevation.

Criteria 3: Map vegetation that could contribute to lynx habitat using the finest-scale vegetation information available.

2001 LAU Map

The 2001 LAU Map used two primary sources of information to map vegetation that contributes to lynx habitat. These were the 1991 Targhee National Forest vegetation layer used in the Targhee Revised Forest Plan EIS and the Targhee National Forest Ecological Unit Inventory (TNFEUI). The TNFEUI was used to identify habitat and community types. The vegetation layer was used to identify the forested habitat types

within the ecological unit[16]. Based on the forested habitat type, it was then labeled as either primary or secondary habitat[17]. The TNFEUI was intersected with the vegetation layer and each ecological unit was identified as meeting primary, secondary, or other habitats. Each ecological unit may have several inclusions of habitat types that occur which are primarily defined by aspect and slope. During the mapping process inclusions of other habitat types within the ecological unit was not considered. In some cases in a subalpine-fir ecological unit Douglas-fir habitat types occurred on south facing slopes and subalpine-fir habitat types occurred on north facing slopes. These areas were not removed from the map within the ecological unit. In some cases this overestimated the amount of forested vegetation belonging to primary or secondary vegetation due to not stratifying out the ecological unit by aspect or slope.

2005 LAU Map

The 2005 LAU Map used the same information as the 2001 mapping process, except within the Centennial, Island Park, and Madison-Pitchstone ecological subsections. In these areas a model developed by McKelvey and McDaniel (2004b) was used to estimate the probability of subalpine fir occurance. The probability of occurrence of subalpine fir was intersected with the forested cover types[18] in the 1991 vegetation layer. This model used the finest scale information available for this technique.

2014 LAU Map

The 2014 LAU Map used the TNFEUI and mapping segments[19], which were used to help create the existing vegetation layer finalized in 2014. As described in the Lynx Habitat Mapping Process Paper (Appendix A), the mapping segments were classified by the vegetation specialist to determine the vegetation type. The 10 meter DEM's (Digital Elevation Model) aspect and slope was used to further refine and stratify the TNFEUI into vegetation contributing to lynx habitat.

Criteria 4: Subalpine fir habitat types dominated by cover types of spruce/fir, Douglas-fir, and seral lodgepole pine should be mapped as primary vegetation.

This criterion is the most critical for mapping lynx habitat and delineating LAU's. LAU's are defined by how much primary vegetation is within a specific an area. There must be at least 10 square miles of primary vegetation to delineate an LAU. (Ruediger et al. 2000 and ILBT 2013)

[16] Ecological unit: a mapped delineation of one or more ecological type, mosaic, or ecotone as they are found in a repeating pattern across the landscape (USDA FS TNFEUI 1999).
[17] It is important to note that the terminology used to identify vegetation that contributes to lynx habitat has since changed to primary and secondary vegetation. The previous terminology used was primary and secondary habitat.
[18] Cover type: the present vegetation composition of an area, described by the dominant plant species (LCAS 3rd edition).
[19] Mapping segment: polygonal segments or modeling units that generally represent discrete areas or objects on a landscape generated from partitioning digital imagery (USDA Forest Service VCMQ 2014).

2001 LAU Map

The 2001 LAU map used the TNFEUI as the primary source to determine where subalpine fir habitat types occurred on the Targhee NF. However, the inclusions[20] within each ecological unit were not considered and were not refined by aspect and slope. The result was an overestimation of the amount subalpine fir habitat types in most units and possibly an underestimation in other units.

The 2001 LAU Map did not consider that some subalpine fir habitat types on rhyolitic soils in the Yellowstone area sustain a dry or persistent lodgepole pine community type. From 2003 to 2005 information was gathered and it was recognized that some subalpine fir habitat types support a dry lodgpole pine community type and will not support a dense understory in the mature and older forest stages as specified in the LCAS. Due to this, the 2001 mapping process overestimated the amount of primary vegetation on the Targhee NF. This overestimation occurred primarily in the Island Park and Madison-Pitchstone ecological subsections.

2005 LAU Map

The 2005 LAU Map used the 2001 mapping process to determined subalpine fir habitat types. The use of this process, as previously noted, overestimated subalpine fir habitat types in some areas and underestimated them in other areas. In 2003, it was determined that primary vegetation or subalpine fir habitat types were overestimated due to the lack of consideration of dry or persistent lodgepole pine community types and dry Douglas-fir habitat types in these areas. To further refine where primary vegetation occurred a model developed by McKelvey and McDaniel (2004b) was used to estimate the probability of subalpine fir. Based on this model, it was estimated that some subalpine fir habitat types occurring on rhyolitic soils have very little subalpine fir and can support a dense understory in the mature and older forest structural stages. The occurrence and probability of subalpine fir were very low. In the Centennials the directional gradient moving to east was strongly associated with the occurrence of subalpine fir. Based on the modeled results, it was determined that areas of 70% occurrence of subalpine fir should be mapped as primary vegetation (McDaniel 2004). The areas of 70% occurrence of subalpine fir were intersected with the 1991 vegetation layer to define the forested areas and define where primary vegetation occurred. Delineations of LAUs were based on these occurrences.

2014 LAU Map

In 2013, a reevaluation of mapping lynx habitat on the Targhee NF was initiated. It was determined that lynx habitat should be further refined and mapped and that consistent procedures and classification should be used to determine primary vegetation for project

[20] Inclusions: areas where the soils, vegetation or landform position differ significantly from the named ecological unit components. They are often ecological types, mosaics, ecotones or miscellaneous areas from adjacent ecological units (USDA FS TNFEUI 1999).

analysis. Using the information from McKelvey and McDaniel (2004b), a reevaluation of the TNFEUI inventory and mapping processes conducted on other National Forests and Yellowstone National Park, it was determined that habitat typing is a recognized classification scheme and should be used to determine primary vegetation. Using the mapping segments developed for the existing vegetation layer and refining TNFEUI using aspect and slope to identify additional inclusions within ecological units, subalpine fir habitat types were consistently mapped across the Targhee NF. Subalpine fir habitat types that support a dry or persistent lodgepole pine community type were identified using the information in the 2005 mapping process, as well as reviewing mapping efforts conducted in Yellowstone National Park and additional scientific literature. It was found that this community type occurred where subalpine fir probabilities were low (<70%), as defined in the 2005 mapping process in the Madison-Pitchstone Plateau and Island park areas. These dry or persistent lodgepole pine community types were not mapped as primary vegetation. In the Centennials more primary vegetation was mapped in 2014 versus 2005 due to refining the inclusions within the ecological units in the TNFEUI and not using the probability model. It is recognized that there may be an overestimation of subalpine fir habitat types in the Centennial area which may need refining. These refinements will occur when site specific project analysis is conducted.

The 2014 LAU mapping process clearly identifies what subalpine fir habitat types on the Targhee NF are classified as primary vegetation and uses this consistent classification across the Forest.

Criteria 5: Other cool, moist habitat types (e.g., some Douglas-fir, grand fir) may contribute to lynx habitat where intermingled with and immediately adjacent to primary vegetation. These types are described as secondary vegetation.

2001 LAU Map

The 2001 LAU Map relied on the TNFEUI as the primary layer to identify cool, moist habitat types. In this process EUI units were identified as secondary vegetation rather than the habitat types contained within them. Additionally inclusions within the EUI units were not mapped so secondary vegetation is likely overestimated. The consideration of intermingled and immediately adjacent to primary vegetation as a criterion was not considered in the 2001 LAU Map, therefore all the secondary vegetation identified was included in the mapping of lynx habitat.

Cool, moist Douglas-fir and other habitat types were not clearly identified. Bradley et. al. 1992 classified habitat types into fire groups which relate to dry and moist habitat types. This could be used to support the rationale in determining what habitat types are cool and moist on the Targhee National Forest. The 2001 mapping process failed to use this reference to determine cool, moist Douglas-fir habitat types.

2005 LAU Map

For identification of secondary vegetation, the 2005 LAU Map relied primarily on the 2001 mapping process and the probability model for the Island Park, Madison-

Pitchstone, and Centennial areas of the Targhee NF. Where the probability of subalpine fir model was used, it was determined that areas of 50-70% probability of subalpine fir were considered secondary vegetation. Outside of these areas secondary vegetation was classified based on the 2001 mapping process.

The 2005 mapping process used two different measures of intermingled or adjacent to primary vegetation. In areas where the probability model was applied, a quarter-mile buffer around primary vegetation was used to determine where secondary vegetation was adjacent or intermingled with primary vegetation. However, in the areas outside of the probability model the 2001 mapping process was used and no determination of intermingled or adjacency was defined.

2014 LAU Map

The 2014 LAU Map relied primarily on the TNFEUI and the mapping segments used in the existing vegetation layer to identify secondary vegetation. This process clearly identified and determined cool, moist, Douglas-fir habitat types using the Fire Groups in Bradley et. al. 1992. Additionally, the TNFEUI was stratified using aspect and slope to determine inclusions within the ecological mapping units. Secondary vegetation was identified only when it was adjacent or intermingled with the primary vegetation identified. Adjacent or intermingled areas were estimated to be approximately 200 meters from primary vegetation. This was used to capture ecotones between primary and secondary vegetation.

Criteria 6: Lynx do not appear to be associated with dry forest habitat types (e.g., ponderosa pine, dry Douglas-fir, and dry or climax lodgepole pine) except to move among mesic stands. These dry types should not be included as vegetation contributing to lynx habitat.

The identification of dry or climax[21] (persistent) lodgepole pine has been one of the biggest differences in mapping lynx habitat on the Targhee NF.

2001 LAU Map

Because the 2001 LAU Map was completed prior to 2003 it did not consider the information gathered from 2003 to 2005 which determined that some subalpine fir habitat types support a dry or persistent lodgpole pine community types. Due to this, dry forest habitat types were mapped as primary vegetation or secondary vegetation. Additionally dry habitat types were not specifically defined. The EUI units were used to identify dry habitat types and did not consider that inclusions of moist Douglas-fir or subalpine fir habitat types within these EUI units.

[21] Climax or climax community: the culminating stage in plant succession for a given environment that develops and perpetuates itself in the absence of disturbance (Steele et al 1983).

2005 LAU Map

Overall dry habitat types were determined using the 2001 mapping process for the 2005 LAU Map, with the exception being in the Centennial, Island Park, and Madison-Pitchstone plateaus areas. In these areas the probability of subalpine fir was a primary factor in determining where dry habitat types occurred. It was determined that areas with less than a 50% probability of subalpine fir are considered dry habitat types and should not be mapped as vegetation contributing to lynx habitat.

2014 LAU Map

Dry forest habitat types for the 2014 map were derived from the Bradley et. al. 1992 fire groups. Dry or persistent lodgpole pine community types were identified using information from McKelvey and McDaniel 2004b, Steele et al 1983, Bradley et. al. 1992, and Despain 1990. The TNFEUI was used along with aspect and slope and inclusions within the TNFEUI mapping units were refined.

Criteria 7: Identify lynx habitat within a Lynx Analysis Unit (LAU).

- **Determine whether the amount and spatial arrangement of vegetation is sufficient to warrant delineation of a LAU (amount, patch size, inter-patch distance).**
    - ***To address the amount and spatial arrangement of vegetation is sufficient to warrant delineation of a LAU the recommendations from the LCAS are used as a guide to determine these factors. These are:***
        - ***Recommend using watersheds 6th code hydrologic unit codes (HUCs) in northerly portions of the lynx geographic areas and 5th code HUCs in more southern portions.***
        - ***Size of an LAU should be generally 25 to 50 square miles in contiguous habitat and larger in less contiguous, poorer quality, or naturally fragmented habitat.***
        - ***At least 10 sq. miles of primary vegetation should be present within each LAU.***
        - ***The distribution of habitat across the LAU should consider daily movement distances of resident females (typically up to 3-6 miles).***
- **Evaluate land ownership patterns.**
- **Review occurrence records of all types to assess validity of identifying the area as lynx habitat.**
- **Snow depth information may be useful to exclude ungulate winter ranges and areas that do not retain adequate snow cover during the winter.**

The mapping processes in 2001, 2005 and 2014 used occurrence records to assess validity of identifying lynx habitat. Based on these occurrence records the Targhee National Forest is considered an occupied forest and the mapping of lynx habitat and LAUs is necessary. However, the Targhee NF has no documented occurrences of lynx reproduction

2001 LAU Map

Due to the overestimation of primary vegetation, LAUs were erroneously delineated to include many areas that are not lynx habitat. Since 2001, HUC boundaries have been updated and many of the LAUs do not follow current HUC boundaries as a primary delineation. Additionally, in some cases the LAU boundaries follow winter ranges identified in the 1997 Targhee Revised Forest Plan. These areas were excluded since they were identified as ungulate winter ranges. Ungulate winter ranges are criteria for delineating LAUs however, if there is adequate information to determine adequate snow depth and cover during the winter. This information and documentation is lacking to establish the criteria of adequate snow cover. Land ownership patterns were considered when delineating LAU's primarily in the Island Park area. Additional criteria not listed above were also considered, such as high road densities and human habitation.

2005 LAU Map

In 2005, the LAU boundaries were adjusted based on new information. The main adjustments were completed due to interpretation of what constitutes primary vegetation. Based on the subalpine fir probability models, many of the LAUs were removed from the Island Park and Madison-Pitchstone Plateau areas. In the Centennials new LAU boundaries were moved to higher elevations and a quarter-mile buffer was placed around primary vegetation based on the probability models to include other cool moist sites that may contribute to lynx habitat. Other LAUs were removed due to not having at least 10 sq. miles of primary vegetation. On the Caribou Range ecological subsection LAUs were dropped due to the lack of existing subalpine fir cover types and a determination that due to many years of fire suppression the landscape had not converted into subalpine fir dominated forest. There was little to no change on other areas on the Forest in the Teton Basin and Big Holes. Theses boundaries relied primarily on the 2001 mapping process, which included using ungulate winter ranges identified in the 1997 Targhee Revised Forest Plan.

2014 LAU Map

The delineations of LAUs in the 2014 mapping process reviewed the 2001 and 2005 LAU mapping processes. The mapping recommendations in the NRLMD EIS Appendix B were followed. The 2014 LAU boundaries vary significantly from those identified in the 2005 mapping process. A primary reason for the variation is the use of habitat types and refining the TNFEUI. The majority of all the 2014 LAUs follow 5^{th} and 6^{th} code HUC boundaries. However, due to the distribution of primary vegetation, some boundaries follow major boundaries such as roads and drainages. Ungulate winter ranges were not considered in this mapping process due to the lack of snow data

available to determine if these areas retain adequate snow cover for lynx. Due to the refinement of the TNFEUI and habitat type determinations, many of the ungulate winter range areas have aspects and slopes (south facing slopes) that likely do not retain adequate snow to be considered lynx habitat; therefore they were not identified to have primary or secondary vegetation attributes. Also, primary and secondary patch sizes were considered. Patch sizes as small as 5 acres were considered and the distances between patch sizes were considered. LAUs were expanded in the 2014 mapping process, due to use of habitat types, patch sizes, and not excluding winter range. In the Caribou ecological subsection patch sizes of primary vegetation is scattered. However, it was determined that the patches and distribution of lynx habitat is large enough and connected enough to reconsider LAUs in this subsection.

Purpose and Need for Action

The purpose and need of this action is to complete an analysis of the affects applying LAU boundaries, consistent with the NRLMD, to the Targhee NF would have on lynx, its habitat, and the habitat of snowshoe hare.

This action responds to the goals and objectives outlined in the NRLMD and the 1997 Revised Forest Plan for the Targhee NF (pg. A-31), and will provide compliance with NEPA (42 U.S.C. § 4321), Forest Service national guidance (FSM 2600), and the Endangered Species Act (16 U.S.C. §1536).

Proposed Action

This section provides a summary of the proposed action. A more detail description of the proposed action can be found in Chapter 2 of this document.

In response to the identified Purpose and Need, the proposed action consists of the following elements:

1. Apply the lynx habitat mapping protocol in Appendix B of the NRLMD Final Environmental Impact Statement (FEIS) to delineate LAUs on the Targhee NF.
    a. Disclose the habitat parameters to delineate LAUs.
2. Disclose the programmatic effects to lynx, its habitat, and the habitat of snowshoe hare from applying LAU boundaries to the Targhee NF.

Decision Framework

The responsible official for this analysis is the Forest Supervisor for the Caribou-Targhee National Forest. Based on the following programmatic analysis and subsequent public comments, the responsible official will review and select an alternative and document the rationale for the selection in a record of decision (ROD). Based on this analysis, the

programmatic decision to be made is what boundaries (LAUs) will be used to analyze the effects site-specific projects may have on Canada lynx.[22]

The responsible official's decision will set a course of action for the management of Canada lynx within the Targhee NF for the next 15-25 years. However, project-level environmental analysis will still be needed for specific proposals to implement the direction provided in the NRLMD and the Targhee RFP.

The decision made will be subject to the predecisional administrative review process outlined in 36 CFR 218. Only those individuals and entities who have submitted timely, specific written comments related to this analysis during any designated opportunity for public comment, as provided in 36 CFR 218, Subparts A and B, may file an objection.

Public Involvement

The Notice of Intent (NOI) for this proposed action was published in the Federal Register on March 22, 2013 under the project title "Amendment to the Targhee Revised Forest Plan – Canada Lynx Habitat". The project was renamed as the "Targhee National Forest Lynx Analysis Units" to more accurately reflect the revised proposed action of the DEIS. The NOI opened a 30-day public scoping comment period, beginning March 22, 2013, on the proposal and asked for comment on preliminary issues, topics, and the preliminary proposed action. Additionally, a letter and scoping document was mailed to groups and individuals who previously expressed interest in the proposed action.

The C-TNF received ten comment letters in response to the 30-day public scoping period. Using the comments received from the public and other agencies (see *Issues* section), the interdisciplinary team developed a list of issues to address in this document.

Issues

The Forest Service separated issues raised during scoping into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this distinction in 40 CFR Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the Comment Response document in the project record.

[22] By definition, an LAU is a unit for which the effect of a project would be analyzed (NRLMD Rod, p. 12).

As for significant issues, the Forest Service identified the following issue during scoping:

ISSUE 1: LAU delineations affect lynx, its habitat, and the habitat of snowshoe hare.

Indicator 1: Changes in the amount of vegetation that contributes to lynx habitat within LAUs.

Rational for Indicator 1: The NRLMD standards and guidelines contribute to the conservation and recovery of Canada lynx. If vegetation that contributes to lynx habitat is not within a LAU these standards and guidelines will not be applied and adverse effects could occur to lynx, its habitat, and the habitat of snowshoe hare.

Measure for Indicator 1: The amount of mapped primary and secondary vegetation within LAUs.

Indicator 2: LAUs are delineated consistent with the NRLMD FEIS and the Lynx Conservation Assessment and Strategy (LCAS) 2nd Edition.

Rational for Indicator 2: If LAUs are delineated consistent with the NRLMD FEIS and LCAS 2nd ed. the NRLMD standards and guidelines that contribute to the conservation of lynx would be implemented appropriately.

Measure for Indictor 2: Percentage of all LAUs that are delineated consistent with the NRLMD FEIS and LCAS.

Collaboration

A collaborative approach has been used throughout the development of this proposed action to help improve communication and develop a better understanding of the issues associated with this analysis. These strategies are described more fully in Chapter 4, Consultation and Coordination. Scoping comments were received from several individuals and organizations representing a range of interests, including environmental concerns, wildlife and fisheries management, and commercial ventures.

Related Laws, Regulations, and Policy

The following laws and regulations apply to all the resources analyzed. Others apply only to a specific resource area and are described in Chapter 3 in the section specific to that resource.

Multiple-Use Sustained-Yield Act

The Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528) says the national forests are established and shall be administered for outdoor recreation, range, timber, watershed and wildlife and fish purposes.

NFMA

The National Forest Management Act (16 U.S.C. 1604) provides direction to the FS about developing, maintaining and revising land and resource management plans. NFMA says plans must provide a sustained yield of goods and services and provide for multiple uses, in a way that will both maximize long-term net public benefits and be environmentally sound.

Consistency with the Forest Plan

The Forest Service meets the requirements of the National Forest Management Act (NFMA) by ensuring decisions are consistent with the applicable Forest Plan, that was developed and approved consistent with the NFMA implementing regulations at 36 CFR part 219. The Targhee portion of the Caribou-Targhee National Forest is managed according to the 1997 Targhee NF Forest Plan. It has been determined that the proposed action is consistent with the 1997 Targhee NF Revised Forest Plan, as amended by the NRLMD.

ESA

The Endangered Species Act (7 U.S.C .136; 16 U.S.C. 1531 et seq.) and 50 CFR 402 apply to federal lands and direct federal agencies to use their authorities to carry out conservation programs for listed species. The Endangered Species Act (ESA) directs federal agencies to make sure their actions are not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of critical habitat. Under ESA, Canada lynx is listed as a threatened species, and is the focus of this proposed management direction. Consultation with the U.S. Fish and Wildlife Service on the Biological Assessment will be completed prior to the release of the Final EIS. All comments received during consultation will be considered in the final environmental analysis.

National Environmental Policy Act

The National Environmental Policy Act (42 U.S.C. 4321 et seq.) requires analysis of decisions to ensure the anticipated effects on the environment within the analysis area are considered prior to implementation (40 CFR 1502.16). The analysis for this

proposed action follows the National Environmental Policy Act (NEPA) guidelines as provided by the Council on Environmental Quality. Alternatives were developed based on the Purpose and Need, the primary issues, public comments, and other information. The range of alternatives, which is addressed in detail in Chapter 2, is appropriate given the scope of the proposal, the public issues expressed, and the Purpose and Need for action.

Chapter 2. Alternatives, Including the Proposed Action

Introduction

This chapter describes and compares the alternatives considered for the Targhee NF Lynx Analysis Unit Programmatic EIS. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental effects of implementing each alternative.

NEPA regulations at 40 CFR 1502.14(a) say an environmental impact statement must *…rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons…*

The courts have established that this does not mean every conceivable alternative must be considered, but that the selection and discussion of alternatives must permit a reasoned choice and foster informed public participation and decision-making. Whether an alternative is *reasonable* is primarily determined by whether it meets the Purpose and Need and whether it represents a distinctly different approach in responding to issues.

The alternatives developed display a reasonable range to guide future projects, respond to the issues, and to meet the Purpose and Need. The range of alternatives presented in this chapter was determined by evaluating the public comments submitted during the scoping period and the Purpose and Need of this action. Suggested alternatives were screened to see if:

1. They met the Purpose and Need, and, if so, whether
2. They provided approaches different from those already included in other alternatives.

Those that did not meet both tests are discussed later in this chapter as *Alternatives Considered but Eliminated from Detailed Study*. That section explains the reasons why some comments with suggested direction or alternatives were not developed further. Therefore, they contribute to the range of reasonable alternatives and a reasoned choice, even though they were eliminated from further consideration.

Alternatives Considered in Detail

The FS developed two alternatives, which include the No Action and Proposed Action alternatives, in response to issues raised during internal and external scoping and which meet the Purpose and Need of this analysis.

The range of alternatives considered in detail will display the effects of applying LAU boundaries to the Forest that best meet the intent of the criteria and procedures established in the NRLMD and LCAS. Further, the range of alternatives will show the variable programmatic effects each alternative will have on lynx, its habitat, and the habitat of snowshoe hare. The comparison of alternatives focuses on the changes in programmatic effects that result from applying LAU boundaries to lynx, its habitat, and habitat for snowshoe hare.

Features Common to All Alternatives

Mapped Primary and Secondary Vegetation

To disclose the effects of how LAU delineations affect lynx, its habitat and the habitat of snowshoe hare it is necessary to identify and map all the primary and secondary vegetation within the planning area. Primary and secondary vegetation are the primary components of lynx habitat. Under both alternatives the amount and location of primary and secondary vegetation is the same on the Targhee National Forest. The NRLMD generally describes the characteristics of primary and secondary vegetation for the western United States and clarifies the descriptions of the vegetation types presented in the LCAS (NRLDM FEIS, Appendix B). Appendix B of the NRLMD FEIS defines primary vegetation as "subalpine fir habitat types dominated by cover types of spruce/fir, Douglas-fir, and seral lodgepole pine…". It also defines secondary vegetation as "….other cool, moist habitat types (e.g., some Douglas-fir, grand fir)… where intermingled with and immediately adjacent to primary vegetation (NRLMD FEIS, Appendix B). Additionally, the NRLMD states:

> "Lynx do not appear to be associated with dry forest habitat types (e.g., ponderosa pine, dry Douglas-fir, and dry or climax lodgepole pine). These dry types should not be included as vegetation contributing to lynx habitat."

The NRLMD EIS defines lynx foraging habitat as habitat that supports snowshoe hares and refers to snowshoe hare habitat as a component of lynx habitat. Lynx habitat selection largely reflects that of snowshoe hares, both seasonally as well as through the hare population cycles (ILBT 2013).

Using the above guidance from the NRLMD, in addition to forest specific research, the C-TNF defined specific habitat types to identify primary and secondary vegetation on the Targhee NF. The criteria and process used to identify primary and secondary vegetation on the Targhee NF is disclosed in Appendix A (Appendix A: Lynx Habitat Mapping Process). Using the process disclosed in Appendix A, 498,548 acres of primary vegetation and 46,084 acres of secondary vegetation, totaling 544,632 acres, was mapped on the Targhee NF.

Per the NRLMD FEIS, Appendix B - Lynx Steering Committee Habitat and Linkage Area Mapping Process, primary and secondary vegetation that falls within an LAU is considered lynx habitat, and management direction will be applied as such. Once

identified as lynx habitat (all primary and secondary vegetation within an LAU) no distinction is made between primary and secondary vegetation; all primary and secondary vegetation within an LAU is managed as lynx habitat (NRLMD FEIS Appendix B, p 447). All NRLMD objectives, standards, and guidelines, except those identified for linkage areas only, will be applied to all mapped lynx habitat on the C-TNF (NRLMD ROD, Attachment 1).

The representation of primary and secondary vegetation in this analysis is based on the current best available scientific information and the mapping process disclosed in Appendix A. Mapping of primary and secondary vegetation (lynx habitat) within an LAU (lynx habitat) may be refined at the project-level through site-specific observation and analysis.

Alternative 1 – No Action

Analyzing a No Action alternative is a requirement of NEPA at 40 CFR 1502.14 and a requirement of FS NEPA policy (FSH 1909.15 Chapter 20). In this case of a programmatic EIS, such as this, the No Action alternative is interpreted to mean there will be no change from the current management direction. In other words, the No Action alternative may be thought of in terms of continuing with the present course of action until that action is changed.

Under the No Action alternative the Targhee NF would continue to not have LAUs that have been vetted or analyzed under NEPA. However, primary and secondary vegetation have been mapped and identified on the Targhee NF according to the direction and criteria provided by NRLMD and LCAS. The criteria and mapping protocol used to identify primary and secondary vegetation on the Targhee NF is specified in detail in Appendix A. For the No Action alternative 544,632 acres of primary and secondary vegetation are mapped on the Targhee NF. Additionally, under the No Action alternative, no lynx habitat has been identified on the Targhee NF.[23]

To date, the C-TNF has not disclosed the affects applying LAU boundaries to the Targhee NF would have on lynx, its habitat, and the habitat of snowshoe hare. Until the C-TNF satisfies the requirements of the Court Order to disclose such effects, LAU boundaries cannot be used to disclose project-level impacts to Canada lynx. Therefore, a decision to adopt the No Action Alternative would result in the continued management of Canada lynx and their associated habitat as directed under the 1997 Targhee RFP and the NRLMD; however proposed projects could not evaluate the effects to Canada lynx until LAUs are established and vetted through the NEPA process.

[23] Per the NRLMD, Appendix B - Lynx Steering Committee Habitat and Linkage Area Mapping Process, primary and secondary vegetation is not considered lynx habitat unless it falls within an LAU (NRLMD FEIS Appendix B, p 447). Since the Targhee NF has yet to vet LAU boundaries through NEPA, satisfying the Court Order, no LAUs exist for the Forest; therefore, lynx habitat cannot be identified for the Targhee NF.

Figure 2.1: No Action Alternative - Primary and Secondary Vegetation on the Targhee NF

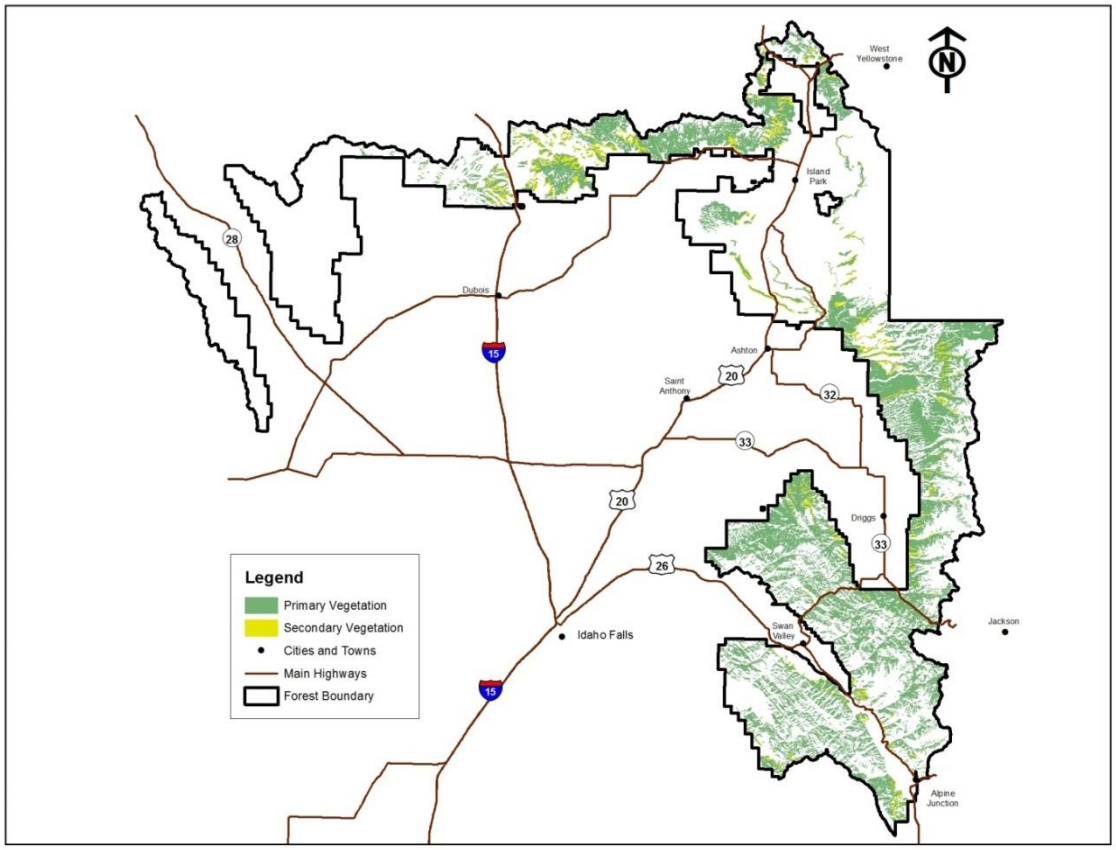


Table 2.1: No Action Alternative - Primary Vegetation, Secondary Vegetation, and Lynx Habitat Acres

LAUs	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Total Primary Secondary (Acres)	Lynx Habitat (Acres)
No LAUs	498,548	46,084	544,632	0

Alternative 2 – The Proposed Action

The Proposed Action is to use the Targhee NF 2014 LAU boundaries (as depicted on the Targhee National Forest 2014 LAU Map) for all future projects to disclose project-level effects to lynx, its habitat, and the habitat of snowshoe hare. LAUs are intended to facilitate project level analysis, monitoring the effects of management actions on lynx habitat and evaluating the standards and guidelines in the Targhee RFP.

The Targhee NF 2014 LAU boundaries were delineated and mapped using the criteria and procedures disclosed in the NRLMD. A detailed description of the process used to delineate the Targhee NF 2014 LAUs can be found in Appendix A (Lynx Mapping Process).

Under the Proposed Action, the mapped primary and secondary vegetation which falls within the Targhee NF 2014 LAU boundaries will be considered mapped lynx habitat. As discussed above (Features Common to All Alternatives), primary and secondary vegetation has been mapped and identified on the Targhee NF according to the direction and criteria provided by NRLMD and LCAS. The criteria and mapping protocol used to identify primary and secondary vegetation on the Targhee NF is specified in detail in Appendix A.

Twenty-four LAUs are delineated on the Targhee NF 2014 LAU Map, encompassing a total of 1,133,575 acres of NFS lands. These LAUs contain 474,440 acres of mapped primary vegetation and 40,701 acres of mapped secondary vegetation, which for future project-level analysis will be considered mapped lynx habitat. For future project occurring in areas containing mapped lynx habitat, the appropriate NRLMD standards and guidelines that are dependent upon having LAUs delineated would be applied. Under the Proposed Action, 515,141 acres of primary and secondary vegetation would be considered mapped lynx habitat (Table 2.2).

Of the total 544,632 acres of primary and secondary vegetation mapped on the Targhee NF, approximately 24,108 acres of primary vegetation and 5,383 acres of secondary vegetation fall outside of the 24 LAU boundaries (Table 2.3). These acres do not fall within LAU boundaries due to these areas not meeting the mapping procedures outlined in the NRLMD EIS Appendix B and Appendix A (Lynx Mapping Process) of this analysis.

If the Proposed Action is selected all management direction provided by the NRLMD for LAUs, including the objectives, standards, and guidelines identified in the NRLMD ROD, will be applied to projects occurring within the Targhee NF 2014 LAU boundaries.

NRLMD Standard LAU S1 will be met if this alternative is selected. Prior to signing the final decision for this analysis, the Intermountain Regional Office review of the Targhee NF 2014 LAU boundaries will be documented in the project record.

Lynx Linkage Areas

Lynx linkage areas are intended to maintain connectivity and allow for movement of animals between blocks of habitat and that are otherwise separated by intervening non-habitat areas such as basins, valleys, and agricultural lands or where habitat naturally narrows due to topographic features (NRLMD FEIS, p. 528). The NRLMD identified lynx linkage areas for the Targhee NF and coarsely mapped them at a broad scale and should be considered as a beginning point only. These areas are displayed on Figure 1-1 of the NRLMD. The process on how these linkage areas were identified is in Appendix B of the NRLMD EIS. There is very limited information at this time to refine these linkage areas on Targhee NF.

Until more information becomes available regarding where linkage areas should be located on the Targhee NF the C-TNF will manage all lands on the Targhee NF that do not fall within lynx habitat (primary and secondary vegetation within an LAU) as linkage areas. Therefore all lands on the Targhee NF that are not identified as lynx habitat will be subject to the linkage objectives, standards, and guidelines found in the NRLMD ROD, thus ensuring conservation measures apply to all the potential linkage areas on the Targhee.

Figure 2.2: Targhee NF 2014 LAU Boundaries

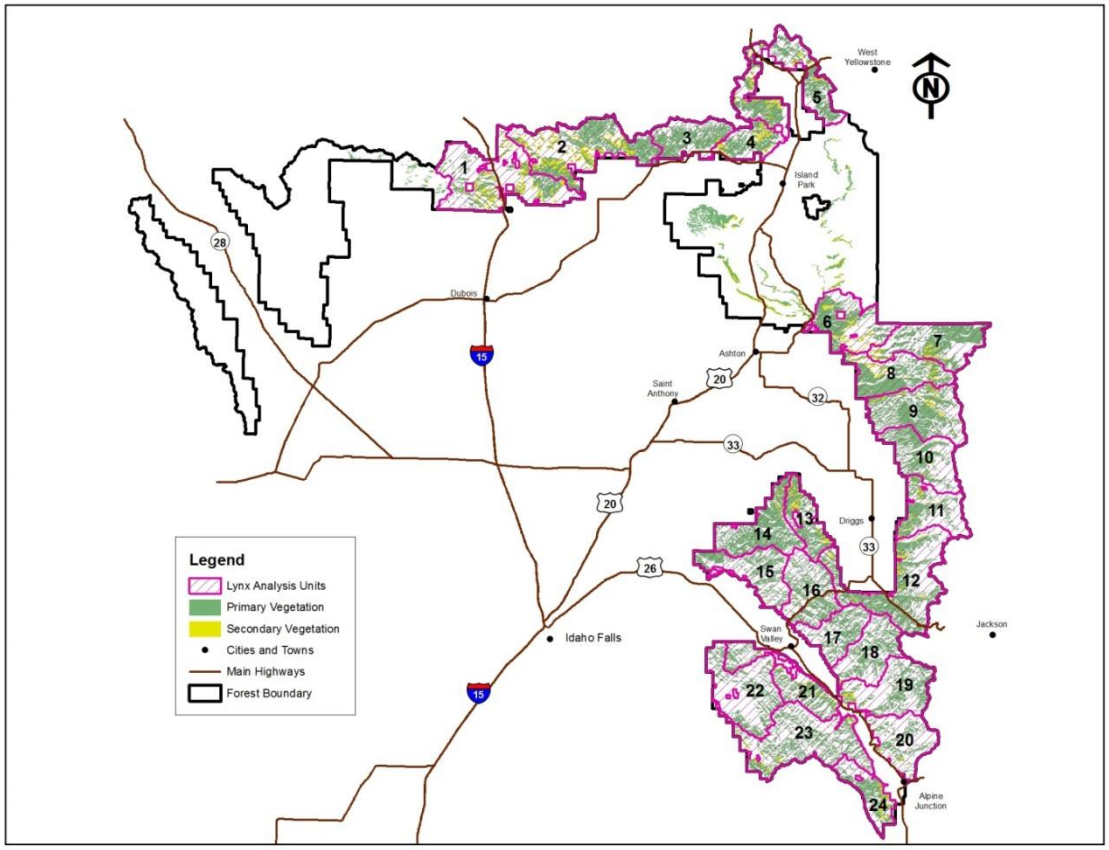


Table 1.2: Alternative 2 - Targhee NF 2014 LAU Boundaries Primary Vegetation, Secondary Vegetation, and Lynx Habitat Acres

LAU #	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Lynx Habitat (Acres)
1	16,788	5,914	22,702
2	32,497	8,694	41,191
3	18,347	189	18,536
4	11,120	2,387	13,507
5	28,065	3,568	31,633
6	19,716	2,674	22,390
7	24,491	1,741	26,232
8	24,621	2,332	26,953
9	29,035	1,692	30,728
10	17,638	403	18,042
11	13,276	1,157	14,433
12	37,531	1,873	39,404
13	15,184	2,066	17,249
14	29,234	544	29,778
15	16,222	74	16,296
16	17,699	170	17,868
17	12,171	0	12,171
18	14,953	147	15,100
19	17,355	796	18,150
20	8,060	742	8,801
21	16,654	973	17,628
22	15,183	58	15,241
23	27,768	1,160	28,927
24	10,833	1,347	12,180
Total	**474,440**	**40,701**	**515,141**

Table 2.3: Alternative 2 – Targhee NF 2014 LAU Acreage Totals

	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Total Primary and Secondary (Acres)	Lynx Habitat (Acres)
Totals Acres	**498,548**	**46,084**	**544,632**	**N/A**
Acres Inside LAUs	474,440	40,701	515,141	515,141
Acres Outside LAUs	24,108	5,383	29,491	0

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of analysis or duplicative of the alternatives considered in detail. Therefore, some alternatives were considered, but dismissed from detailed consideration for reasons summarized below and further explained in Chapter 1 of this analysis. The alternatives considered, but eliminated from detailed study include: the Targhee NF 2001 LAU Boundaries; the Targhee NF 2005 LAU Boundaries; and a Forest Plan Amendment.

To display the different programmatic effects varying LAU boundaries have on lynx, its habitat, and the habitat of snowshoe hare, the 2001 and 2005 LAU boundary configurations were considered as alternatives for this analysis, but after further consideration they were eliminated from detailed study. Several of the LAU boundaries identified on the 2001 and 2005 LAU maps do not meet the intent of the criteria and procedures established in the NRLMD and LCAS (see Chapter 1, Background). LAU boundaries that do not meet the intent of the criteria and procedures established in the NRLMD and LCAS are identified as being invalid LAUs for this analysis. Valid LAUs are those boundaries which meet the intent of the criteria and procedures established in the NRLMD and LCAS.

As discussed in Chapter 1, the primary reason for the differences in the delineation of LAUs is due to the refinement of mapping of vegetation that could contribute to lynx habitat on the Targhee. This includes what constitutes primary vegetation, secondary vegetation, and vegetation not contributing to lynx habitat. Additional understanding of the amount and spatial arrangement of vegetation that contributes to lynx habitat and the use of ungulate winter ranges as defining where adequate snow cover occurs have refined where vegetation that contributes to lynx habitat has been mapped.

A detailed discussion on how each mapping effort (Targhee NF 2001 LAU Map, Targhee NF 2005 LAU Map, and Targhee NF 2014 LAU Map) compares to the criteria outlined in Appendix B of the NRLMD EIS is in Chapter 1 of this document. This details how each mapping process compares to the mapping criteria and discloses the rationale on why each mapping process is different.

In 2001, the first LAU delineation was mapped on the Targhee National Forest in response to the Canada Lynx Conservation Agreement between the U.S. Forest Service and the U.S. Fish and Wildlife Service in 2000. This is known as the Targhee NF 2001 LAU Map. Primary vegetation was mapped based upon the criteria that all subalpine fir habitat types were considered vegetation that contributed to lynx habitat. Some persistent lodgepole pine community types were considered as non-lynx habitat especially in the Island Park Caldera. Ungulate winter ranges were considered as not having adequate snow cover and were excluded as areas that support lynx habitat. Based

upon this information LAUs were delineated around what was mapped as primary vegetation at the time.

In 2003, an interagency lynx coordination meeting was held. Several key questions were discussed in defining the attributes of primary vegetation and secondary vegetation. One of the main concerns was subalpine fir habitat types occurring on rhyolitic soils being considered primary vegetation when they support a long time seral (persistent) lodgepole pine community type. One conclusion of the interagency lynx coordination meeting was that these habitat types will not support snowshoe hare densities high enough for suitable forage for lynx. Based upon the considerations it was recommended that it was likely these habitat types would not contribute to lynx habitat. To attain more information several administrative studies were conducted to improve the identification of vegetation that contributes to lynx habitat between 2003 and 2005. Based upon the results of these studies several conclusions and recommendations were made: 1) continuous areas of subalpine fir were not evident across the East Plateau and lower elevations in the Centennial Mountains; 2) most subalpine fir habitat types were the dry type for this region and dense forest cover for snowshoe hare would occur only in small patches discontinuously throughout the area; and 3) snowshoe hare abundance was low compared to areas in more continuous habitat.

With the information gained from several administrative studies the 2001 LAU delineations were revised in 2005. This map is known as the Targhee NF 2005 LAU Map. Much of the persistent lodgepole pine types on rhyolitic soils were no longer considered primary vegetation based upon the probability of subalpine fir occurring. Additional remapping of primary vegetation occurred in the Centennial Mountains. Many areas were considered dry habitat types that would not support vegetation that contributes to lynx habitat due to the probability of subalpine fir. Due to this new information and better understanding of primary vegetation, the amount of primary vegetation that was mapped in 2005 significantly decreased from the amount that was previously mapped in 2001. Due to this decrease in mapped primary vegetation some LAUs were removed because they no longer contained enough mapped primary vegetation to satisfy LAU delineation criteria. Other LAUs were re-delineated to adjust for the smaller amounts of primary vegetation than was previously mapped.

In 2012, the Split Creek Precommercial Thinning Project was enjoined due to the 2005 LAU delineations not being vetted through the NEPA process. Following the 2012 court ruling, the C-TNF reevaluated the 2005 LAU delineations. Based on additional information at that time and building upon the information and administrative studies that were conducted for the Targhee NF 2005 LAU Map, the C-TNF determined that vegetation that contributes to lynx habitat would need to be remapped which would likely change LAU delineations. This new mapping effort resulted in the Targhee NF 2014 LAU Map or the Proposed Action. Appendix A (Lynx Habitat Mapping Process) details the mapping process used to develop the Targhee NF 2014 LAU Map. Based upon the results of the McDaniel and McKelvey (2004b) study of the modeling of subalpine fir presence, Despain 1990, and Bradley et. al 1992, it was recognized that certain subalpine fir habitat types support a dry persistent lodgepole pine community

types which do not provide the habitat characteristics to support snowshoe hare populations to sustain lynx reproduction and survival. Every forest habitat type on the Targhee National Forest was classified into primary, secondary, or dry forest vegetation. Utilizing the TNFEUI, topographic models, and new vegetation delineations, primary and secondary vegetation was mapped. Utilizing new watershed layers LAUs were delineated. Based upon the new delineations and habitat type classification it was not necessary to use ungulate winter ranges as a criteria. New information on adequate patch size of primary vegetation was also utilized and warranted additional LAUs that were not identified in the previous LAU mapping efforts. Currently, the Targhee NF 2014 LAU Map is the best available information on how LAUs are to be delineated based upon the mapping of primary vegetation.

Because the Targhee NF 2014 LAU Map is based on the best available information at this time, the Targhee NF 2001 and 2005 LAU boundaries were considered in this analysis but eliminated as alternatives considered in detailed study. To further illustrate how the 2001 and 2005 LAU boundaries do not meet the intent of the criteria and procedures established in the NRLMD and LCAS (see Chapter 1, Background), the following analysis demonstrates the inconsistencies of these LAU configurations with the NRLMD and LCAS.

Targhee NF 2001 LAU Boundaries

The Targhee NF 2001 LAU boundaries were delineated and mapped under the provisions of the Canada Lynx Conservation Agreement (2000) using the best available information at that time. Chapter 1 of this document provides a comparison, relative to the mapping direction provided by the NRLMD, of the criteria used in 2001, 2005, and 2014 to delineate LAUs.

Based on the current knowledge (see Chapter 1) that the 2014 mapping effort used the best available information to identify primary and secondary vegetation on the Targhee NF, the C-TNF can conclude that the primary and secondary vegetation mapped in 2001 was an inferior depiction of the actual on the ground habitat conditions. Therefore, for this analysis the 2001 LAU boundaries were considered relative to the latest depiction of primary and secondary vegetation on the Targhee NF (the 2014 mapped primary and secondary vegetation). As shown in Figure 2.3, the C-TNF overlaid the 2001 LAU boundaries on the 2014 mapped primary and secondary vegetation layer to evaluate how well the 2001 LAU boundaries compare to best available information on primary and secondary vegetation and to determine how well the 2001 LAU boundaries comply with the NRLMD criteria for LAU delineation. The results were as follows:

Twenty-six LAUs are delineated on the Targhee NF 2001 LAU Map, encompassing a total of 1,134,982[24] acres of FS managed lands. When overlaid on the 2014 mapped

[24] The Split Creek Precommercial Thinning Environmental Assessment, including the Targhee National Forest 2001 LAU map, and the Native Ecosystems Council and Alliance for the Wild Rockies v. U.S. Forest Service Memorandum Decision and Order (U.S. District Court for the District of Idaho; Case No. 4:11-cv-00212-CWD, Doc. 54, June 6, 2012) referenced acreage amounts for LAUs, primary vegetation,

primary and secondary vegetation, these LAUs contain 425,028 acres of mapped primary vegetation and 35,859 acres of mapped secondary vegetation (Table 2.5). However, five of these LAUs do not meet the definition and criteria of an LAU provided by the NRLMD, because they do not have at least 10 square miles of primary vegetation (Ruediger et al. 2000, p.7-4[25]) or the LAU is delineated around an isolated patch of primary vegetation and is not within a female lynx's daily movement range (approximately 3 to 6 miles) to other contiguous patches of primary vegetation (Ruediger et al. 2000, p. 6-2[26], p. 7-4[27]). Because the five LAUs do not meet the definition and criteria of an LAU they are invalid LAUs. The invalid LAUs are LAU # 6, 7, 8, 9, and 24, as depicted on the Targhee NF 2001 LAU Map (Figure 2.3). The remainder of the 2001 LAUs are valid LAUs because they meet the criteria of having at least 10 square miles of primary vegetation provided in the NRLMD.

Upon removing the 5 invalid LAUs, the valid 2001 LAU boundaries contain 404,459 acres of mapped primary vegetation and 34,593 acres of mapped secondary vegetation, which for future project-level analysis would be considered mapped lynx habitat. For future projects occurring in areas containing mapped lynx habitat, the appropriate NRLMD standards and guidelines would be applied. Using the 2001 LAU boundaries, a total of 439,052 acres of primary and secondary vegetation would be considered mapped lynx habitat.

Of the total 544,632 acres of primary and secondary vegetation mapped and identified on the Targhee NF (2014 mapped primary and secondary vegetation), approximately 94,089 acres of primary vegetation and 11,491 acres of secondary vegetation fall outside of the 21 valid 2001 LAU boundaries. These acres do not fall within LAU boundaries due to these areas not meeting the mapping procedures outlined in the NRLMD EIS Appendix B and Appendix A (Lynx Mapping Process) of this analysis.

If this alternative were considered in detail and selected, the management direction provided in the NRLMD would not be properly applied to the Targhee NF. The use of the 2001 LAU boundaries would result in approximately 94,089 acres of primary vegetation and 11,491 acres of secondary vegetation not receiving the management direction that contributes to the conservation and recovery of Canada lynx intended by the NRLMD (Figure 2.5). Therefore, this alternative was eliminated from detailed consideration.

and secondary vegetation that differ from the above mentioned acreages for the 2001 LAU map. These acreage differences are due to changes in the application of mapping procedures used in this analysis verses those used in 2001 and adjustments to the Forest System Lands boundaries within the Targhee NF.

[25] Based on studies at the southern part of lynx range in the western US, it appears that at least 10 square miles of primary vegetation should be present within each LAU.

[26] A single LAU, isolated from other block of lynx habitat, is unlikely to effective in providing lynx habitat in sufficient amount to increase lynx numbers… (Ruediger et al. 2000, p. 6-2).

[27] The distribution of habitat across the LAU should consider daily movement distance of resident females (typically 3-6 miles) (Ruediger et al. 2000, p. 7-4).

Figure 2.3: Targhee NF 2001 LAU Boundaries and 2014 Mapped Primary and Secondary Vegetation

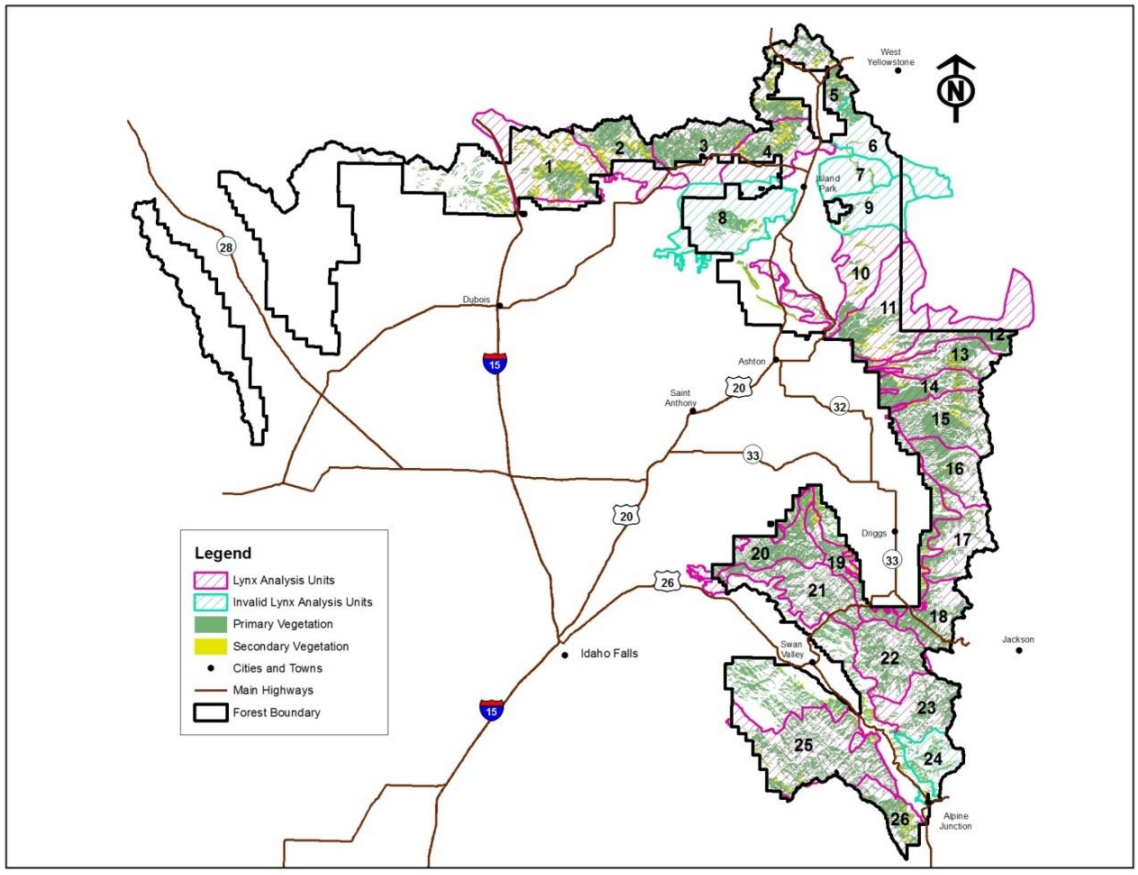


Table 2.4: Targhee NF 2001 LAU Boundaries, 2014 Primary and Secondary Vegetation, and Lynx Habitat Acres

LAU #	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Lynx Habitat (Acres)
1	18,129	8,501	26,631
2	16,720	3,548	20,268
3	24,166	242	24,408
4	12,966	2,516	15,482
5	23,025	3,388	26,413
6 (Invalid LAU)	3,559	95	0
7 (Invalid LAU)	1,403	201	0
8 (Invalid LAU)	7,880	544	0
9 (Invalid LAU)	1,341	161	0
10	8,106	1,994	10,100
11	16,213	2,666	18,879
12	11,816	307	12,123
13	16,145	2,141	18,287
14	18,819	1,270	20,089
15	28,543	1,649	30,192
16	15,998	412	16,411
17	13,699	830	14,528
18	18,496	200	18,696
19	19,021	1,258	20,279
20	26,840	543	27,383
21	25,257	139	25,396
22	23,617	0	23,617
23	15,907	258	16,165
24 (Invalid LAU)	6,387	265	0
25	40,069	1,382	41,451
26	10,909	1,347	12,256
Total	**425,028**	**35,859**	**439,052**

Table 2.5: Alternative 3 - Targhee NF 2001 LAU Acreage Totals

	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Total Primary Secondary (Acres)	Lynx Habitat (Acres)
Totals Acres	**498,548**	**46,084**	**544,632**	**N/A**
Acres Inside Valid LAUs	404,459	34,593	439,052	439,052
Acres Inside Invalid LAUs	20,569	1,266	21,835	0
Acres Outside Valid LAUs (includes acres inside invalid LAUs)	94,089	11,491	105,580	0

Targhee NF 2005 LAU Boundaries

The Targhee NF 2005 LAU boundaries were delineated and mapped using habitat modeling methods developed after the Targhee NF 2001 LAU Map was created. The methods used to delineate the 2005 LAU boundaries used the best available information at that time. Chapter 1 of this document provides a comparison, relative to the mapping direction provided by the NRLMD, of the criteria used in 2001, 2005, and 2014 to delineate LAUs.

Based on the current knowledge (see Chapter 1) that the 2014 mapping effort used the best available information to identify primary and secondary vegetation on the Targhee NF, the C-TNF can conclude that the primary and secondary vegetation mapped in 2005 was an inferior depiction of the actual on the ground habitat conditions. Therefore, for this analysis the 2005 LAU boundaries were considered relative to the latest depiction of primary and secondary vegetation on the Targhee NF (the 2014 mapped primary and secondary vegetation). As shown in Figure 2.4, the C-TNF overlaid the 2005 LAU boundaries on the 2014 mapped primary and secondary vegetation layer to evaluate how well the 2005 LAU boundaries compare to best available information on primary and secondary vegetation and to determine how well the 2005 LAU boundaries comply with the NRLMD criteria for LAU delineation. The results were as follows:

Seventeen LAUs are delineated on the Targhee NF 2005 LAU Map, encompassing a total of 660,468 acres of FS managed lands. When overlaid on the 2014 mapped primary and secondary vegetation, these LAUs contain 308,365 acres of primary vegetation and 17,458 acres of secondary vegetation (Table 2.7). However, one of these LAUs do not meet the definition and criteria of an LAU provided by the NRLMD, because they do not have at least 10 square miles of primary vegetation (Ruediger et al. 2000, p. 7-4[28]) or the LAU is delineated around an isolated patch of primary vegetation and is not within a female lynx's daily movement range (approximately 3 to 6 miles) to other contiguous patches of primary vegetation (Ruediger et al. 2000, p. 6-2[29], p. 7-4[30]). Because this one LAU does not meet the definition and criteria of an LAU it is considered an invalid LAU. The invalid LAU is LAU # 24, as depicted on the Targhee NF 2005 LAU Map (Figure 2.4). The remainder of the 2005 LAUs are valid LAUs because they meet the criteria of having at least 10 square miles of primary vegetation as provided in the NRLMD.

Upon removing the one invalid LAU, the valid 2005 LAU boundaries contain 301,978 acres of mapped primary vegetation and 17,193 acres of mapped secondary vegetation, which for future project-level analysis would be considered mapped lynx habitat. For future projects occurring in areas containing mapped lynx habitat, the appropriate

[28] Based on studies at the southern part of lynx range in the western US, it appears that at least 10 square miles of primary vegetation should be present within each LAU.
[29] A single LAU, isolated from other block of lynx habitat, is unlikely to effective in providing lynx habitat in sufficient amount to increase lynx numbers… (Ruediger et al. 2000, p. 6-2).
[30] The distribution of habitat across the LAU should consider daily movement distance of resident females (typically 3-6 miles) (Ruediger et al. 2000, p. 7-4).

NRLMD standards and guidelines would be applied. Using the 2005 LAU boundaries, a total of 319,171 acres of mapped primary and secondary vegetation would be considered mapped lynx habitat.

Of the total 544,632 acres of primary and secondary vegetation mapped and identified on the Targhee NF (2014 mapped primary and secondary vegetation), approximately 196,570 acres of primary vegetation and 28,891 acres of secondary vegetation fall outside of the 16 valid 2005 LAU boundaries. These acres do not fall within LAU boundaries due to these areas not meeting the mapping procedures outlined in the NRLMD EIS Appendix B and Appendix A (Appendix A: Lynx Habitat Mapping Process) of this analysis.

If this alternative were considered in detail and selected, the management direction provided in the NRLMD would not be properly applied to the Targhee NF. The use of the 2005 LAU boundaries would result in approximately 196,570 acres of primary vegetation and 28,891 acres of secondary vegetation not receiving the management direction that contributes to conservation and recovery of Canada lynx intended by the NRLMD (Figure 2.7). Therefore, this alternative was eliminated from detailed consideration.

Figure 2.4: Targhee NF 2005 LAU Boundaries

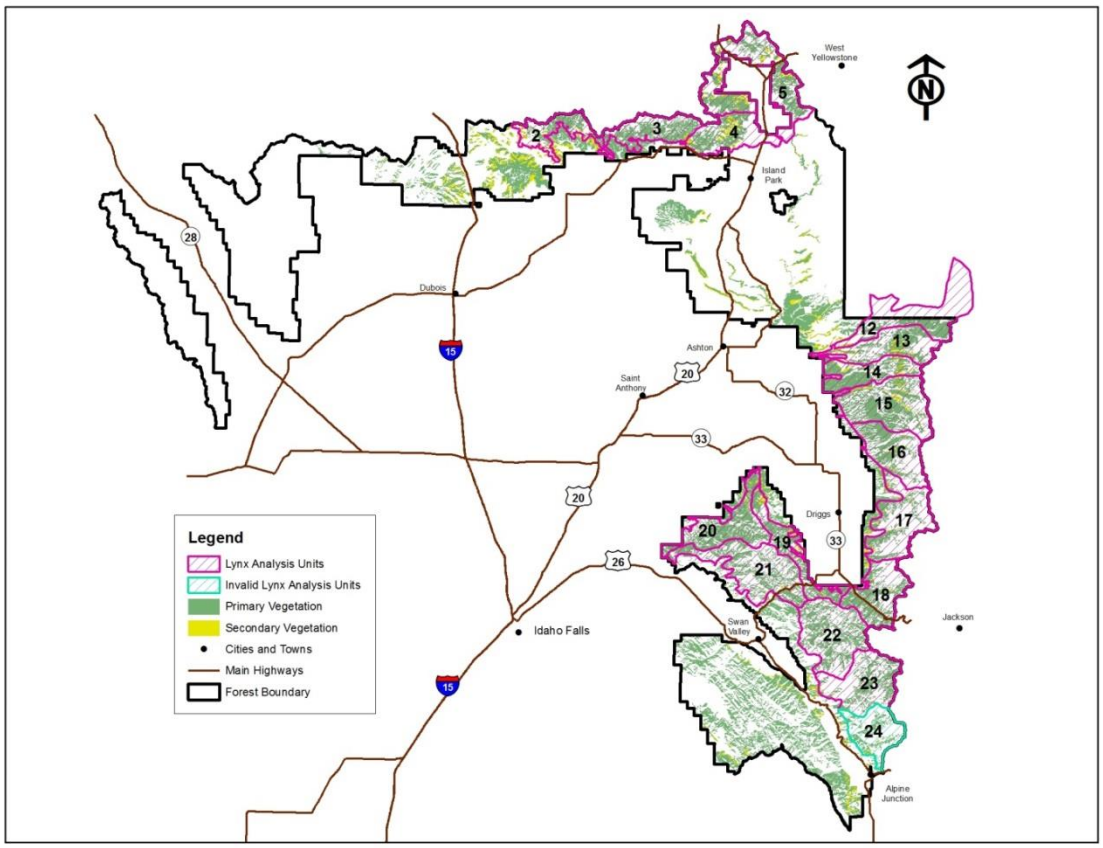


Table 2.6: Alternative 4 - Targhee NF 2005 LAU Boundaries Primary Vegetation, Secondary Vegetation, and Lynx Habitat Acres

LAU #	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Lynx Habitat (Acres)
2	10,765	2,060	12,824
3	17,890	238	18,128
4	12,833	2,499	15,332
5	26,333	3,388	29,721
12	11,816	307	12,123
13	16,145	2,141	18,287
14	18,819	1,270	20,089
15	28,543	1,649	30,192
16	15,998	412	16,411
17	13,699	830	14,528
18	18,496	200	18,696
19	19,021	1,258	20,279
20	26,840	543	27,383
21	25,257	139	25,396
22	23,617	0	23,617
23	15,907	258	16,165
24 (Invalid LAU)	6,387	265	0
Total	**308,365**	**17,458**	**319,171**

Table 2.7: Alternative 3 - Targhee NF 2005 LAU Acreage Totals

	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Total Primary Secondary (Acres)	Lynx Habitat (Acres)
Totals Acres	**498,548**	**46,084**	**544,632**	**N/A**
Acres Inside Valid LAUs	301,978	17,193	319,171	319,171
Acres Inside Invalid LAUs	6,387	265	6,652	0
Acres Outside Valid LAUs (includes acres inside invalid LAUs)	196,570	28,891	225,461	0

Forest Plan Amendment

The possibility of a plan amendment was the identified purpose and need in the original Notice of Intent for this analysis. Based on the review of internal and external scoping input, it has been determined that amending the Targhee RFP is not necessary. Pursuant to Forest Service Planning regulations, 36 CFR 219.13(a), a plan amendment is required to add, modify, or remove one or more plan components, or to change how or where one or more plan components apply to all or part of the plan area. The proposed action does neither.

The proposed action is the establishment of LAUs that meet the existing forest plan direction from the NRLMD plan amendment. It is not changing, adding, or deleting any forest plan direction. The existing direction requires that LAUs be used to evaluate effects of management activities on lynx. The existing direction provides how the LAU boundaries are established and is not being changed. This programmatic proposed action merely applies the existing direction to establish LAUs for this analysis.

The LAUs that are being disclosed and analyzed in this environmental impact statement only depict the result of applying the existing direction that establishes where the standards and guidelines of the NRLMD are applied; therefore, the LAUs themselves do not change the management direction of the NRLMD.

Because the proposed action neither adds, modifies, or removes forest plan direction and does not change the direction provided in the NRLMD it does not meet the purpose for a plan amendment as set forth in the Forest Service Planning regulations.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2.8. Alternative Comparison Table

Alternatives	**Issue Indicators**	
	Acres of Lynx Habitat (Primary and Secondary Vegetation within LAU boundaries)	**Number and Percent of LAUs delineated consistent with the criteria and procedures in the NRLMD and LCAS**
Alternative 1: No Action	0 *(No LAUs have been vetted through NEPA)*	0 *(No LAUs have been vetted through NEPA)*
Alternative 2: Proposed Action - 2014 LAU Boundaries	515,141	24 of 24: 100%

Chapter 3. Affected Environment and Environmental Consequences

This Chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter.

Effects Considered

Three kinds of environmental effects are possible; direct, indirect and cumulative.

Direct effects are those that occur at the same time and place as the action. There are no direct environmental consequences of the proposal. The proposal is programmatic in nature, consisting of direction that would be applied to future management activities. It does not prescribe site-specific activities on the ground, and therefore would have no direct environmental effects. Direct effects would be disclosed later at the project level, when site-specific decisions are made.

This analysis evaluates the *indirect* and *cumulative effects* of the Proposed Action and alternatives. An indirect effect is one caused by the action, but occurs later in time or further removed in distance, but is still reasonably foreseeable (40 CFR 1508.8). Cumulative effects are environmental consequences that result for the incremental impact of an action added to other past, present, and reasonable foreseeable action. Cumulative impacts can result from individually minor but collectively significant action taking place over a period of time (40 CFR 1508.7).

Canada Lynx

Affected Environment

Lynx Biology and Ecology

Canada lynx are medium-sized forest carnivores occupying northern forests with abundant snowfall. They have long ear tufts, lightweight body frames and very large paws for their size which act like snowshoes supporting them on fluffy snow. Information on lynx biology and ecology can be found in; "The Canada Lynx Conservation Assessment and Strategy" (LCAS). Currently there are the 2nd edition (Ruediger et al. 2000) and the 3rd edition (ILBT 2013). The 3rd edition is a full revision of the 2nd edition and incorporates substantial new scientific information. Chapter 2 in the 3rd edition of the LCAS has incorporated the most up to date information and provides an overview of lynx ecology and biology. The guidance provided in the revised LCAS was written as conservation measures. Conservation measures are meant to synthesize and interpret evolving scientific information and have not been established through the public planning process.

Lynx Occurrences on the Targhee National Forest

Canada lynx have historically been very rare within and adjacent to the Targhee National Forest. For the time period covering 1842-1998, there have only been 32 documented occurrences within the Targhee Forest boundary (Ruggiero et al. 1999). The majority of these occurrences occurred in the two ecological subsections; the Centennial Mountains and the Teton Range.

Beginning in 1999 and continuing through 2003, the Forest participated in a national lynx detection survey, using the national lynx detection survey protocol (McKelvey et al. 1999). Only one Canada lynx was detected on the Forest during the surveys, and this was on the westslope of the Tetons in 2003.

From 1996 to present, the Targhee National Forest has also conducted winter snow tracking routes to help document the presence and distribution of lynx and other furbearers. Possible lynx tracks have been recorded only 3 times when doing these winter snow tracking routes (USDA FS 2009).

Incidental observations by Forest personnel record other possible lynx sightings when they receive them. From 1998-present only 2 confirmed sightings have been recorded. They occurred in 1998 and 1999 in the Lemhi/Medicine Lodge and Big Hole Mountains (USDA FS 2009).

During August of 2000 and 2001, a radio-collared male Canada lynx was located for a short period of time each year on the Targhee Forest. This male lynx was originally trapped and radio-collared in the Wyoming Mountain Range near Big Piney, Wyoming. During the summer months, he would leave the Wyoming Range and make a long trek, which included the Island Park and eastern Centennial portions of the Forest (Murphy et al. 2005; Squires and Laurion 2000). He only was on the forest during the summer months.

From 1999 through 2006 the Colorado Division of Wildlife reintroduced 218 lynx into southwestern Colorado (Theobald 2011). All lynx were released with dual VHF/satellite radio collars so they could be monitored. One female lynx and 2 male lynx from this reintroduction effort traveled across the Targhee National Forest in 2005, 2006, 2007, and 2010. During this time they were on the forest for a very short time (less than a month) and moved across the forest during the spring, summer and fall.

To date there is no documentation or evidence of reproduction of Canada lynx on the Targhee National Forest which includes detection of dens or a female lynx with kittens.

Endangered Species Act Listing

The Fish and Wildlife Service (FWS) published a proposed rule on July 8, 1998 to list the lynx under the Endangered Species Act (ESA) of 1973, as amended (Federal Register Volume 63, No. 130. Pp. 36994-37013). On March 24, 2000, the FWS

published the final rule listing the Contiguous United States Distinct Population Segment (DPS) as a threatened species (Federal Register Vol. 65, No. 58, pp. 16052-16086).

The decision to list lynx as a single DPS and as threatened was challenged and the courts remanded the decision back to the FWS. On July 3, 2003, the FWS published a Notice of Remanded Determination of Status for the Contiguous United States Distinct Population Segment of the Canada Lynx (Federal Register Vol. 68, No. 28, pp. 40076-40101). In its finding, the FWS again reaffirmed its previous conclusion that the Canada lynx remain under threatened and not endangered status.

A Recovery Outline for the Contiguous United States DPS of Canada Lynx (U.S Fish and Wild Service 2005) was prepared by the FWS and made available on Sept. 14, 2005. A recovery outline is intended to provide interim guidance for consultation and recovery efforts until a formal recovery plan has been approved.

Under the recovery outline, lynx habitat was stratified into core, secondary and peripheral areas based on lynx occupancy, reproduction, and use as documented by historical and current records. Core areas were identified where there was strong evidence of long-term persistence of lynx populations, including both historical records of lynx occurrence over time, and recent (within the past 20 years) evidence of reproduction. Secondary areas were identified where there were historical records of lynx presence, but fewer than in core areas, and no recent documentation of presence or reproduction or where there were historical records of lynx, but current status is unknown due to lack of recent surveys. Peripheral areas were identified where there were sporadic historical records of lynx, which generally corresponds to cyclic population highs in Canada, and there was no evidence of reproduction. Based on the preliminary map compiled by the FWS the Targhee National Forest has core areas identified along the Wyoming border in the Teton Range and the rest of the Forest is identified as secondary areas (Figure 1-1 NRLMD EIS or FWS 2005 Figure 1 Canada Lynx Recovery Areas). There are no peripheral areas identified on the Targhee National Forest. The core area identified on the Targhee National Forest has no evidence of reproduction in the past 20 years.

Critical habitat for the lynx was designated on November 9, 2006 (Federal Register Vol. 71, No. 217, pp. 66008–66061). On July 20, 2007, the FWS announced that the final critical habitat rule would be reviewed in light of questions that had been raised about the integrity of the decision-making process. Based on this review, the FWS concluded that the final rule was improperly influenced by the then-Deputy Assistant Secretary of the Interior. On January 15, 2008, the U. S. District Court for the District of Columbia issued an order establishing deadlines for reissuing the critical habitat rule. The revised final rule designating critical habitat was published in the Federal Register, Vol. 74, No. 36, pp. 8616–8702 on February 25, 2009. In July and September of 2010, the District Courts in Montana and Wyoming, respectively, took exception to parts of the revised critical habitat designation and again remanded the rule to the FWS. On September 12, 2014 the FWS published the remanded final rule for critical habitat. This rule became effective on October 14, 2014 (Federal Register Vol. 79, No. 177, pp. 54782-54846). No

critical habitat was designated on the Targhee National Forest in any of the final rule revisions.

Canada Lynx Conservation Agreements and NRLMD

In response to the FWS listing of the Canada lynx the FS and FWS entered into a Lynx Conservation Agreement in February 2000 (USDA FS, USDI FWS 2000). This conservation agreement required the FS to review and consider the recommendations in the LCAS before making decisions about projects in lynx habitat. The Targhee National Forest was included in this agreement. In May of 2005 the FS and FWS signed a new Canada Lynx Conservation Agreement to replace the 2000 conservation agreement. In this agreement the agencies again agreed to review and consider the LCAS prior to making any new decisions on occupied[31] lynx habitat. This agreement also said the agencies will work together to identify and refine criteria for classifying lynx habitat as occupied habitat. An area is considered occupied when:

1. There are at least 2 verified lynx observation or records since 1999 on the national forest unless they are verified to be transient individuals; or
2. There is evidence of lynx reproduction on the national forest.

In 2006, based on this definition nine National Forests were considered occupied. The Targhee NF met these criteria due to the occurrence detected on the National Lynx Survey and the documented use by the radio collared male lynx in 2000 and 2001 (USDA FS, USDI FWS 2006). The Targhee NF does not have any evidence of lynx reproduction.

In October 2006, a new Canada Lynx Conservation Agreement was signed and was in effect until December 31, 2010 or until all National Forests with occupied habitat have revised their Forest Plans. This conservation agreement was an extension to the 2005 agreement.

In March 2007, the NRLMD ROD was signed by the FS. The forest plan direction in this decision fulfilled the Lynx Conservation Agreement to amend the plans. With this decision, the goals, objectives, standards, and guidelines in the NRLMD were incorporated into existing plans on nine National Forests. This includes the Targhee National Forest. Because the Targhee NF is an occupied area, the NLDMD applies to the Forest. However, the NRLMD specifies which standards and guidelines apply to lynx habitat (primary and secondary vegetation within LAUs) and linkage areas (all Targhee NF acres not considered lynx habitat) within the occupied area. The NRLMD was based upon the science and recommendations in Ruggiero et al 2000, the LCAS 2nd Edition, and numerous other publications. It was determined that the NRLMD provided

[31] Occupied: An area is considered occupied by lynx when there are at least two verified lynx observations or records since 1999 on the national forest unless they are verified to be transient individuals; or there is evidence of lynx reproduction on national forest.

direction that contributes to conservation and recovery of the Canada lynx in the Northern Rockies Ecosystem (USDA FS NRLMD ROD 2007).

The forest is an occupied area, which contains lynx habitat (primary and secondary veg within LAUs), which is where the standards and

In 2013 the Interagency Lynx Biology Team published and revised the Canada Lynx Conservation Assessment and Strategy. In this revision, the ILBT 2013 LCAS incorporates concepts from the FWS Canada Lynx Recovery Outline (USDI FWS 2005). Under this revision conservation efforts for lynx are not to be applied equally across the range, but focus is given to the core areas identified in the FWS Canada Lynx Recovery Outline. The ILBT 2013 LCAS emphasizes the protection of core areas, which support persistent lynx populations and have evidence of recent reproduction, and less stringent protection and greater flexibility in secondary/peripheral areas which only support lynx intermittently (ILBT 2013). The ILBT 2013 LCAS recommends that LAUs be used as a tool to guide management that will support reproductive population of lynx in core areas. In secondary/peripheral areas it is not necessary to delineate LAUs. Currently, there is no evidence of recent lynx reproduction on the Targhee National Forest. This updated information may be useful for project planning and implementation, as well as helping to inform future amendments or revisions of the Targhee National Forest Plan. Currently, the NRLMD is the management guidance for future project development on the Targhee National Forest.

Lynx Habitat

In general, lynx habitat attributes are gentle, rolling topography with dense horizontal cover, persistent snow, and moderate to high snowshoe hare densities (>0.5 hares/ha [0.2 hares/ac]). Spruce-fir forests are the primary vegetation type that characterizes lynx habitat in the contiguous United States (ILBT 2013). Snow conditions and vegetation type are important factors in defining lynx habitat (Ruediger et al. 2000).

The information in the 2000 LCAS, 2013 LCAS, and Appendix B of the NRLMD EIS is the primary source that describes vegetation types that contribute to lynx habitat in the Western US and in the Northern Rocky Mountains Geographic Area. The general description of lynx habitat in the western U.S. and the Northern Rocky Mountain Geographic Area has not changed in the 2013 LCAS. The Targhee National Forest is located in the western US and in the Northern Rocky Mountain Geographic Area.

There are two types of vegetation that contribute to lynx habitat which are identified as primary and secondary vegetation. Primary vegetation is necessary to support lynx survival and reproduction. This is type of vegetation includes cool, mesic subalpine fir habitat types dominated by cover type of Engelmann spruce/subalpine fir, Douglas-fir, and seral lodgepole pine. Secondary vegetation is other cool, moist habitat types (e.g., some Douglas-fir, grand fir) that are intermingled with and immediately adjacent to primary vegetation may contribute to lynx habitat due to the recognition that lynx are highly mobile and this type of vegetation that may be used by lynx. Lynx do not appear

to be associated with dry forest habitat types (e.g., ponderosa pine, dry Douglas-fir, and dry or climax lodgepole pine) except to move among mesic stands. These dry habitat types should not be considered vegetation contributing to lynx habitat.

Starting in 2001 the Caribou-Targhee National Forest began mapping and identifying vegetation that contributes to lynx habitat based upon the general descriptions in the 2000 LCAS on the Targhee portion of the forest. As new information became available about vegetation types that contribute to lynx habitat, the identification and mapping of vegetation has been refined over time. Over the past several years, interagency meetings, administrative studies, and mapping techniques have been used to develop forest habitat types that contribute to lynx habitat. Based upon the best available information primary and secondary vegetation has been identified on the Targhee National Forest. The process on how primary and secondary vegetation has been identified and mapped is in Appendix A: Lynx Habitat Mapping Process Targhee National Forest. The amount of available primary vegetation on the Targhee National Forest is estimated at 498,548 acres and secondary vegetation is estimated at 46,084 acres. All of the primary and secondary vegetation identified may not meet the conditions for lynx habitat. The amount and spatial arrangement of primary and secondary vegetation must be considered in determining if it meets the conditions that contribute to lynx habitat. The process of delineating lynx analysis units (LAUs) considers these conditions and determines the amount of vegetation that contributes to lynx habitat.

Lynx Foraging Habitat (i.e. Snowshoe Hare Habitat)

Snowshoe hare habitat is generally a subset of Lynx habitat. Snowshoe hares are the primary prey of lynx, comprising 35 to 97 percent of the diet throughout the range of lynx. Lynx survivorship, productivity and population dynamics are closely related to snowshoe hare density in all parts of it range. Additional information of the importance of snowshoe hare to lynx can be found in "Ecology and Conservation of Lynx in the United States' by Ruggiero, et al. (2000) and the 2nd and 3rd edition of the LCAS.

Lynx habitat selection largely reflects that of snowshoe hares, both seasonally as well as through the hare population cycle (LCAS 2013). The NRLMD EIS defines lynx foraging habitat as habitat that supports snowshoe hares. The NRLMD refers to snowshoe hare habitat as a component of lynx foraging habitat. Snowshoe hare habitat consist of (1) places where young trees or shrubs grow densely, often thousands of woody stems per acre or (2) places where mature forest grow which have high horizontal cover. Not all lynx habitat within a given area will provide high quality snowshoe habitat due to difference in vegetative structural stages resulting from disturbance agents (fire, insect outbreaks, timber harvest, wind events, etc.) which may have occurred at various points in time. A description of vegetative structural stages is in the NRLMD EIS Figure 3-2. Forest vegetation in the stem exclusion, young forest multistoried and old forest single storied are unlikely to provide high quality snowshoe hare habitat due to not having high horizontal cover and forage in the understory. The stand initiation, understory reinitiation, and old forest multistoried are more likely to provide high quality

snowshoe hare habitat due to having the potential of high horizontal cover and forage in the understory. In the stand initiation stage, the quality of habitat is dependent on shrub and tree densities in the summer and the amount of cover these trees and shrubs provide in the winter above the snow. In the understory reinitiation and old forest multistoried vegetation structural stages, the quality of habitat is dependent on the shrub and tree densities in the understory and the amount of cover and forage they provide in the summer and the cover they provide in the winter above the snow.

This programmatic EIS analysis evaluates approaches to delineating LAUs. Once delineated, proposed projects analyses will be able to assess the effects on vegetative structural stages and evaluate the amount of lynx habitat providing high quality snowshoe hare habitat as well as effects of management activities on snowshoe hare habitat.

Vegetation Management

Vegetation management practices can have beneficial, neutral, or adverse effects on lynx and snowshoe habitat (ILBT 2013, p. 71). Vegetation management occurs across the range of the lynx and can directly affect important habitats and prey. The NRLMD defines vegetation management as changing the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire or timber harvest (NRLMD ROD, p. 15). The definition does not include removing vegetation for permanent developments like mineral operations, ski runs, roads and the like (NRLMD ROD, p. 15). All vegetation treatment types can have temporary effects to habitat as outlined in the NRLMD and all editions of the LCAS. As stated in the Biological Opinion for the NRLMD, "eventually these stands regenerate and provide high stem densities and horizontal structure extending above snowpack during the winter, and become high quality snowshoe hare habitat." (NRLMD BO, p. 41). The vegetation exemptions listed in the NRLMD, which allow vegetation treatments meeting certain criteria, are one reason why adverse impacts to lynx were states as possible. These impacts are partially offset by the vegetation objectives, standard, and guidelines which contribute to sustaining and growing snowshoe hare and lynx populations. The objectives, standards, and guidelines are applied within each LAU. The delineation of LAUs will provide the parameters to apply the objectives, standards, and guidelines which will further retain and promote important lynx habitat components. The configuration of those LAUs would not directly impact the effects of the vegetation treatments on lynx or snowshoe hare habitat. Direct and indirect effects of vegetation treatments would be analyzed at the project level.

A variety of vegetation treatments can directly affect important habitats and prey. Theses affects can be beneficial, neutral, or adverse effects and can be localized or broad scale effects depending on treatment design. For example, when designing a commercial timber harvest, it would be possible to create additional early-successional[32] forest conditions in areas that are capable of, but not currently providing, dense horizontal

[32] Succession (successional): the progressive changes in plant communities toward climax, with qualification, may refer to progressive changes in a direction other than climax.

cover, which would benefit snowshoe hares and create additional habitat over time, by considering the appropriate size and shape of treatment units, retaining coarse woody debris, and maintaining high stem densities in regenerated forests (ILBT 2013). The following vegetation management activities effects will be discussed further: timber harvest, thinning, fuels reduction, prescribed fire, wildland fire management, and range.

Timber Harvest (Including Thinning):

Commercial timber management traditionally has been designed to: improve growth and vigor of mature trees (e.g., commercial thinning, thinning from below); reduce the vulnerability of commercially-valuable trees to insects and disease (e.g., commercial thinning, group selection); and harvest forest products (e.g., regeneration harvest). Historically, the dominant natural disturbance processes that created early-successional stages within the range of the lynx were wind events, fire, and insect and disease outbreaks (ILBT 2013). Timber management practices may mimic natural disturbance processes but often are not an exact ecological substitute (ILBT 2013). Vegetation management that promotes high stem density and dense horizontal cover can increase snowshoe hare densities (ILBT 2013).

Uneven-aged management (single tree and small group selection) practices can be employed in stands where there is a poorly developed understory, but have the potential to produce dense horizontal cover for snowshoe hares. Removal of select large trees can create openings in the canopy that mimic gap dynamics and help to maintain and encourage multistory attributes within the stand. This type of treatment has the potential to improve habitat for snowshoe hares and lynx.

If removal of large trees opens the canopy to the extent that the patch functions as an opening, this may discourage use by lynx (Koehler 1990a, Koehler et al. 2008, Maletzke 2004, Squires et al. 2010). Removal of larger trees from mature multi-story forest stands to re-duce competition and increase tree growth or resistance to forest insects may reduce the horizontal cover (e.g., boughs on snow), thus degrading the quality of winter habitat for lynx (Robinson 2006, Koehler et al. 2008, Squires et al. 2010). Similarly, removing understory trees from mature multi-story forest stands reduces the dense horizontal cover selected by snowshoe hares, and thus reduces winter habitat for lynx (ILBT 2013).

As shown above, effects of timber harvest can be beneficial, neutral, or adverse and can be localized or broad scale depending on treatment design. With no other treatments, treated stands, eventually, regenerate and provide higher stem densities and horizontal structure extending above snowpack during the winter, and can become higher quality snowshoe hare habitat.

Precommercial Thinning:

Precommercial thinning of young, dense regenerating conifers is generally designed to increase the growth of selected trees by removing competing trees of the same species or

shrubs and trees of other species. Reducing the density of sapling-sized conifers in young regenerating forests to increase the growth of certain selected trees promotes more homogeneous patches and reduces the amount and density of horizontal cover, which is needed to sustain snowshoe hares (Sullivan and Sullivan 1988, Hodges 2000b, Griffin and Mills 2004, Ausband and Baty 2005, Griffin and Mills 2007, Homyack et al. 2007, Ellsworth 2009). Precommercial thinning has been shown to reduce hare numbers by as much as 2- and 3-fold (Griffin and Mills 2004, 2007; Homyack et al. 2007) due to reduced densities of sapling and shrub stems and decreased availability of browse. Griffin and Mills (2007) reported that, if their results were representative, the practice of precommercial thinning could significantly reduce snowshoe hares across the range of lynx (ILBT 2013).

Bull et al. (2005) reported that the slash and coarse woody debris remaining after precommercial thinning provided both forage and cover for snowshoe hares up to a year following treatment. However, Homyack et al. (2007) found that snowshoe hare densities were reduced following precommercial thinning for 1–11 years post-thinning. They further suggested that after precommercial thinning, the stands did not regain the structural complexity in the understory that would be needed to support snowshoe hare densities to the level that were present pre-treatment. At this time, no other data are available to quantify the reestablishment of snowshoe hare habitat and over what time period, or the response by snowshoe hares, as compared with sites that were not precommercially thinned, so this remains an unproven management technique. As an alternative to standard precommercial thinning (i.e., complete thinning resulting in a homogeneous patch), Griffin and Mills (2007) suggested retaining at least 20% of the patch in untreated clumps of about ¼ ha (½ ac), which would maintain hare habitat in the short term. However, Lewis et al. (2011) found that landscapes with patches of high-quality habitat surrounded by similar vegetation supported more hares than did more fragmented landscapes composed of high-quality patches in a matrix of poorer quality habitat. Further long-term studies of modified thinning methods are needed (ILBT 2013).

The anecdotal research of precommercial thinning treatments are showing effects can be beneficial, neutral, or adverse and can be localized or broad scale depending on treatment design. Eventually treated stands regenerate and provide higher stem densities and horizontal structure extending above snowpack during the winter, and can become higher quality snowshoe hare habitat. Localized, project level, effects and analysis of exemptions given in the NRLMD would be addressed at the project level using the LAU boundaries as references to address the potential effects to lynx, lynx habitat, and snowshoe hare habitat.

Fuels Treatments & Prescribed Fire:

Fuels treatments commonly are designed to remove understory biomass and reduce stem density in forests that are outside their historical range of variability, and to clear fuels adjacent to human developments for safety or to protect investments (ILBT 2013). Prescribed burning is a technique used to reduce tree stem density and reduce fuels. In

the western United States, projects designed to restore forests to a condition more representative of the historical range of variability are generally targeted to drier, lower-elevation forests affected by fire suppression (Hessburg et al. 2005), which are not lynx habitat. Lynx habitats in higher-elevation spruce-fir forests have been less affected by past fire suppression and are mostly within the historical range of variability (Agee 2000). Fuels treatments may be needed to protect human communities and capital improvements by reducing the intensity and rate of spread of a fire, affording control actions with a higher probability of success and providing safer conditions for fire fighters. By removing or reducing the understory and ladder fuels to meet those objectives, dense horizontal cover important to snowshoe hares is reduced and habitat value is diminished for hares and lynx.

Effects of prescribed burning can be beneficial, neutral, or adverse and can be localized or broad scale depending on treatment design. Eventually burned stands regenerate and provide higher stem densities and horizontal structure extending above snowpack during the winter, and become higher quality snowshoe hare habitat.

Wildlife Fire Management:

Fire and other natural disturbance processes historically played an important role in maintaining a mosaic of forest successional stages that provides habitat for both snowshoe hare and lynx (Fox 1978, Bailey et al. 1986, Quinn and Thompson 1987, Koehler and Brittell 1990, Poole et al. 1996, Slough and Mowat 1996). The response of snowshoe hare and lynx in their use of habitat after fires follows a somewhat predictable pattern. For the first few years after a burn, there appears to be a negative correlation between lynx use and the amount of area burned (Fox 1978). This short-term effect is likely a response to a reduction of snowshoe hare populations, reduced cover, and possibly also to increased competition from coyotes in the now open habitat (Stephenson 1984, Koehler and Brittell 1990). The mid-term (10–40 years post-fire) effect on vegetation in a burned area is development of small tree and shrub cover sufficient for hare populations to reoccupy the area. The length of time varies depending on tree species, potential vegetation, fire severity, and the presence of re-sprouting broadleaf species. Where broadleaf species are denser, hare re-occupancy occurs more quickly (within 3–12 years). Hare population density again decreases as the conifer tree canopy develops and shades out the understory. Forest gap processes, such as tree blowdown, insect infestations, and outbreaks of disease, follow a similar pattern (Agee 2000) (ILBT 2013).

The current goals for vegetation management on federal lands in the United States are to restore ecosystem health, ecological processes, and forest structure, composition, and function appropriate to the site (e.g., USDA FS 2010). Westerling et al. (2006) suggested fuel management and ecological restoration practices will likely not reverse current wildfire trends; large increases in wildfires in the western United States since 1970 resulted from increased temperatures and earlier spring snowmelt. Particularly in the western United States, ecosystem restoration is primarily focused in the dry and mesic forest types at lower elevations, rather than in lynx habitat, and includes reestablishing

frequent, low intensity fire in those systems. Applying ecosystem restoration across a landscape may reduce the risk of uncharacteristic large, stand replacing fires occurring in the lower elevation forest types, and thereby prevent their spread into adjacent lynx habitat (ILBT 2013).

After large dead trees fall to the ground, they provide cover and may enhance lynx foraging habitat in the short term and potential denning habitat in the longer term, depending on post-disturbance stand conditions. Standing snags also may provide sufficient vertical structure and cover to allow lynx to traverse long distances (>1 km [>0.6 mi]) across burned habitat (Maletzke 2004) (ILBT 2013).

Similar to vegetation management, wildland fire management may diminish, enhance, or sustain the density and distribution of snowshoe hare prey resources and lynx habitat, depending on the design and implementation of programs and actions (ILBT 2013). These effects can be beneficial, neutral, or adverse and can be localized or broad scale depending on treatment design.

Grazing by Domestic Livestock:

Grazing by domestic sheep, goats and cattle is common in the western United States. There is little scientific information available about dietary overlap with, or competition between, livestock and snowshoe hares, or the response of snowshoe hares to livestock grazing. If there were significant forage competition, this could have an indirect impact on lynx by reducing its prey base (ILBT 2013).

The summer diet of snowshoe hares is dominated by herbaceous food including forbs, grasses, and leaves of shrubs. The winter diet is restricted to woody browse, including smaller-diameter twigs, branches, small stems and evergreen needles of shrubs and trees (Adams 1959, Wolff 1978, Koehler 1990a, Hodges 2000a). The habitats used by snowshoe hare that are most likely to be affected by livestock grazing are riparian willow and aspen communities (ILBT 2013).

High-elevation riparian areas dominated by willows have been shown to provide important summer and fall habitat for lynx in Colorado (Shenk 2008). In Wyoming, Berg and Gese (2012) found hare use during the summer of small patches of forest surrounded by non-forest vegetation containing willow. Overbrowsing by domestic livestock or wild ungulates that altered the structure or composition of the native plant community[33], particularly by impacting willows, could negatively affect snowshoe hare habitat (ILBT 2013).

Overall, grazing or browsing by domestic livestock on federal lands is unlikely to reduce the snowshoe hare prey base or have a substantial effect on lynx. Grazing/browsing could have some localized effects on high-elevation willow communities or aspen stands if not managed appropriately (ILBT 2013).

[33] Community (plant community) is defined as an assembly of plants living together, denotes no particular ecological status. The basic unit of vegetation (Steele et al 1983).

Habitat Fragmentation

The term “fragmentation” is used to describe human-caused alterations of natural landscape patterns that reduce the total area of habitat, increase the isolation of habitat patches, and impair the ability of wildlife to effectively move between those patches of habitat. Fragmentation may be permanent, for example by converting forest habitat to residential or agricultural purposes, or temporary, for example by creating an opening but allowing trees and shrubs to regrow. Fragmentation of habitat accentuates the viability risk inherent in a small population and increases its vulnerability to local extirpation. The combination of human-caused and natural disturbances may exacerbate fragmentation effects (ILBT 2013).

A variety of anthropogenic activities can result in increased habitat fragmentation at the lynx home range or broader scale. For example, permanent or temporary removal of forest cover, development of highways and associated infrastructure, and intensive minerals or energy development can fragment lynx habitat (ILBT 2013). The following five anthropogenic activities have the potential to permanently remove primary and secondary vegetation: highways/transportation; mineral development; special use authorizations; land ownership changes; and climate change (ILBT 2013).

Highways/Transportation:

Highways typically follow natural features such as rivers, valleys, and mountain passes that may have high value for lynx in providing habitat or connectivity. Highways pose a risk of direct mortality to lynx and may inhibit lynx movement between previously connected habitats. If lynx avoid crossing highways, this could lead to a loss of effective habitat within a home range and reduced interaction within a local population (Apps et al. 2007). Lynx and other carnivores may avoid using habitat adjacent to highways, or become intimidated by highway traffic when attempting to cross (Gibeau and Heuer 1996, Forman and Alexander 1998). As the standard of road increases from gravel to 2-lane or 4-lane highways, traffic volumes and the degree of impact are expected to increase. Four-lane highways, such as the interstate highway system, commonly have fences on both sides, service roads, parallel railroads or power lines, and impediments like "Jersey barriers" that make successful crossing more difficult, or impossible, for wildlife (ILBT 2013, Plate 4.5). Alexander et al. (2005) suggested traffic volumes between 3,000 and 5,000 vehicles per day may be the threshold above which successful crossings by carnivores are impeded (ILBT 2013).

In contrast to highways, Forest and backcountry roads are typically low-speed (<56kph [<35 mph]), single- or double-lane gravel or paved roads. Extensive (>600 km [>373 miles]) backtracking studies found that lynx did not avoid gravel forest roads (Squires et al. 2010). Trails are typically narrow routes with a native surface; there is no information to suggest that trails have negative impacts on lynx (ILBT 2013).

Construction of roads results in a small reduction of lynx habitat by removing forest cover. In some instances, vegetation along less-traveled roads provides good snowshoe hare habitat, and lynx may use the roadbed for travel and foraging (Koehler and Brittell 1990). Similar to McKelvey et al. (2000*d*), Squires et al. (2010) concluded that forest roads with low vehicular or snowmobile traffic had little effect on lynx seasonal resource selection patterns in Montana. In Maine, Fuller et al. (2007) documented lynx traveling on roads (unplowed during winter), but determined that roads and their associated edges were selected against within home ranges (ILBT 2013).

Mineral Development:

Leasable minerals

Activities associated with exploration and development of leasable minerals could affect lynx habitat by changing or eliminating the native vegetation and contributing to habitat fragmentation. Development of a high density of wells, as is typical of coal-bed methane development (e.g., 1 well per 2–4 ha [5–10 ac]), could affect lynx by directly removing habitat. The development of associated roads, powerlines, and pipelines to facilitate exploration and development could also result in a loss of lynx habitat and contribute to fragmentation of habitat. In some areas, for example in the Wyoming Range, extensive oil and gas development is occurring within lynx habitat (ILBT 2013).

Locatable minerals

Activities associated with exploration and development of locatable minerals could affect lynx habitat by changing or eliminating the native vegetation, and by contributing to habitat fragmentation. Amount of impact can be variable depending on the size of the associated mining operation or development. Locatable minerals are extracted through both open pit and sub-surface mines with potential habitat alteration ranging from tens to thousands of hectares. In some instances, such as larger mining operations, land exchanges are conducted to consolidate private ownership of the surface above a deposit prior to mine development. Depending on lands exchanged this could retain lynx habitat in public ownership, but could still result in a net loss of habitat. Development of road and railroad access to facilitate exploration and development could also directly impact lynx habitat, contribute to fragmentation, facilitate increased competition as a result of snow-compacted routes, and result in direct mortality. Despite these potential impacts, mining exploration and development is generally anticipated to affect only a small portion of lynx habitat in the contiguous United States (ILBT 2013).

Salable minerals

In general, salable minerals are found close to the surface. During exploration activities, equipment is moved to the site and a number of test pits are dug or holes drilled to determine the quality of material. If desired minerals are found in suitable quantity, then vegetation is removed and materials are excavated (ILBT 2013).

Areas developed for salable minerals can vary in size from a single truck load to tens of acres. Impacts to lynx could include the potential alteration or removal of lynx habitat, increased fragmentation, and the potential for human-caused mortality from road development (ILBT 2013).

Special Use Authorizations:

Wind energy

Wind energy development and associated transmission lines in lynx habitat is increasing across the nation. Facilities are located on ridge tops or other areas exposed to consistent wind. The construction of wind facilities including access roads may result in loss of lynx habitat and increased fragmentation from permanent forest clearings. Noise and human activity associated with operation of wind facilities would likely continue through the life of the project, which may exceed 20 years (ILBT 2013).

Utility corridors

Utility corridors contain developments such as overhead or buried powerlines and gas pipelines, and often are located within or adjacent to existing road rights-of-way. Utility corridors potentially could have short- or long-term impacts to lynx habitats, depending on location, type, vegetation clearing standards, and frequency of maintenance. Those that are extensively cleared of vegetation and maintained in a low structure condition likely equate to a permanent habitat loss. When associated with highways and railroads, utility corridors may further widen the right-of-way. Utility corridors may facilitate human access into previously remote areas (ILBT 2013).

Other Forest Uses

Construction or expansion of developed areas such as large ski areas and 4-season resorts, as well as smaller recreational sites like nordic ski huts or campgrounds, may directly remove forest cover. Such removal in lynx habitat could decrease prey availability, affect lynx movement within home ranges, or result in a more fragmented landscape (ILBT 2013).

Land Ownership Changes:

In the northern Rockies, Forest Service lands are generally fairly well connected, providing a good opportunity to maintain lynx habitat connectivity. Forest Service land ownership changes can occur through land exchanges, direct purchase, and conservation easements that enhance and protect wildlife habitat (USDA FS, NRLMD FEIS 2007). Fragmentation of lynx habitat on the Targhee NF could result from Forest Service land ownership changes, for example by converting forest habitat to residential or agricultural purposes (ILBT 2013).

Climate Change:

Physical and biological systems on all continents and in most oceans are being affected by climate change, especially by regional temperature increases (Rosenzweig et al. 2007). Climate change is strongly affecting some species and altering many aspects of systems that are related to snow, ice, and frozen ground (Hannah and Lovejoy 2003, Root et al. 2003, Harris et al. 2006, Parmesan 2006, Rosenzweig et al. 2007). Inkley et al. (2004) and Rosenzweig et al. (2007) predicted that the ranges of wildlife and native plants in North America will generally move northward or to higher elevations as temperatures increase (ILBT 2013).

Several possible effects of climate change on lynx can reasonably be anticipated. These include: 1) potential upward shifts in elevation or latitudinal distribution of lynx and their prey; 2) changes in the periodicity or loss of snowshoe hare cycles in the north; 3) reductions in the amount of lynx habitat and associated lynx population size due to changes in precipitation, particularly snow suitability and persistence, and changes in the frequency and pattern of disturbance events (e.g., fire, hurricanes, insect outbreaks); 4) changes in demographic rates, such as survival and reproduction; and 5) changes in predator-prey relationships. In addition, it is possible that interactions between these variables may intensify their effects (ILBT 2013).

Climate change may reduce the extent of deep snow habitats selected by lynx. Based on a general circulation model, Kerr and Packer (1998) predicted that lynx would be among the 25 mammal species in Canada likely to undergo significant losses of habitat, with accompanying decreases in population size. McKelvey et al. (2011) estimated that contiguous areas of spring snow cover would become smaller and more isolated throughout the Columbia, Upper Missouri, and Upper Colorado Basins, with greatest losses at the southern periphery, which likely is an indicator of the trajectory of lynx habitat. According to Carroll (2007), climate change could result in dwindling of potential lynx habitat in the northern Appalachians to small areas in the Canadian Maritime Provinces.

Forests in the northeast are predicted to significantly change in the next 100 years under every emissions scenario (Prasad et al. 2007). The extent of oak and pine forest types is projected to increase and expand into central and possibly northern Maine (Iverson et al. 2008). Maine and the northeast forest region are predicted to lose much of their spruce-fir and mixed-conifer forest, including upland spruce-fir forest and lowland spruce flats (Prasad et al. 2007, Ollinger et al. 2008, Tang and Beckage 2010). Warming climate and selective logging for conifers has already resulted in an increase of the deciduous forest in northern Maine (Seymour 1992), which is contributing to fragmentation of lynx habitat (Simons 2009).

Galatowitsch et al. (2009) estimated that by 2069, average annual temperatures in Minnesota will increase 3° C (5.4° F) with a slight increase (6%) in precipitation. Minnesota forests will experience warmer summers with more frequent and longer droughts. Most simulations for the Great Lakes-St. Lawrence Basin predict reduced

precipitation and lower lake levels (Inkley et al. 2004). Similarly, most climate models predict that the northern Rockies and the Greater Yellowstone ecosystem will be warmer and drier, with increased risk of bark beetle epidemics and forest fires in susceptible age classes. The recent mountain pine beetle outbreak in British Columbia, for example, was associated with warmer winters, longer growing season, and fire suppression (Gayton 2008).

An increasing occurrence and persistence of drought, along with associated insect outbreaks and wildfires, could rapidly and dramatically affect the distribution, amount, and composition of lynx habitat. Cohen and Miller (2001) suggested climate change could alter both the nature and extent of wildfire and beetle outbreaks. With warming climate, fire seasons in the western United States will likely be extended and the total area burned may increase (McKenzie et al. 2004). Westerling et al. (2006) predicted that warmer springs could increase the frequency and duration of wildfires, which in turn could reduce the resistance of surviving trees to bark beetle attack. Raffa et al. (2008) suggested that increasing temperatures and forest homogeneity likely will result in bark beetle outbreaks that exceed natural disturbance thresholds; this may set the landscape for additional outbreaks since there will be even-aged forests over a larger area.

Westerling et al. (2006) compiled information on large wildfires in the western United States from 1970–2004; large wildfire activity increased suddenly and markedly in the mid-1980s, with higher large-wildfire frequency, longer wildfire durations, and longer wildfire seasons. The greatest increases occurred in mesic, middle- and high-elevation forest types (such as lodgepole pine and spruce-fir) in the northern Rocky Mountains. Fire exclusion has had little impact on natural fire regimes of these higher-elevation forest types in this area; rather, climate appears to be the primary driver of forest wildfire risk. Large wildfires were strongly associated with increased spring and summer temperatures and an earlier spring snowmelt (ILBT 2013).

Lynx Analysis Units (LAUs)

An LAU is an area used to evaluate effects of management activities on individual lynx. It is about the size of a female lynx home range, from 15,000 to 30,000 acres or about 25 to 50 square miles in contiguous habitat. In less contiguous, poorer quality habitat LAUs should be larger. The criteria and steps to identify and delineate LAUs can be found in the NRLMD EIS Appendix B and in the 2000 LCAS as well as the 2013 LCAS. LAUs are identified based upon the amount of primary vegetation and the spatial arrangement of primary and secondary vegetation. A sufficient amount of primary vegetation to support a female lynx must be present. In the western United States, it appears that at least 10 sq. miles of primary vegetation must be present. The arrangement of primary and secondary vegetation within an LAU should take into consideration the daily movement distances of female lynx (approximately 3 to 6 miles).

LAU boundaries also should follow other landscape level boundaries such as watersheds. Once LAUs have been delineated around primary and secondary vegetation, there is no longer a distinction between them and they are considered lynx

habitat. The application of certain NRLMD standards and guidelines at the LAU scale allows blocks of quality lynx habitat to be maintained within each LAU, thereby maintaining a good distribution of lynx habitat at the scale of a lynx home range.

This programmatic EIS analysis is evaluating alternative approaches to delineating LAUs. LAUs are used to evaluate effects of management activities on individual lynx and apply the NRLMD standards and guidelines.

Lynx Linkage Areas

Lynx linkage areas are intended to maintain connectivity and allow for movement of animals between blocks of habitat and that are otherwise separated by intervening non-habitat areas such as basins, valleys, and agricultural lands or where habitat naturally narrows due to topographic features (USDA FS, NRLMD FEIS, p. 528). The NRLMD identified lynx linkage areas for the Targhee NF and coarsely mapped them at a broad scale. These areas are displayed on Figure 1-1 of the NRLMD. The areas identified as linkage areas on Figure 1-1 of the NRLMD appear to be areas where potential highway crossing could occur, areas associated with potential highway and forest road construction, and/or areas that may provide connectivity to other lynx habitat.

Although the NRLMD roughly identified linkage areas on the Targhee NF, there is very limited information at the forest level to determine where specific linkage areas should be identified for the Targhee NF. Until more information becomes available regarding where linkage areas should be located on the Targhee NF the C-TNF will manage all lands on the Targhee NF that do not fall within lynx habitat (primary and secondary vegetation within an LAU) as linkage areas. Therefore all lands on the Targhee NF that are not identified as lynx habitat will be subject to the linkage objectives, standards, and guidelines found in the NRLMD ROD, thus providing the best management possible to promote the recovery of Canada lynx.

Environmental Consequences

There are two indicators that measure the programmatic effect LAU delineations have on lynx, its habitat, and the habitat of snowshoe hare.

Indicator 1: Changes in the amount of vegetation that contributes to lynx habitat within LAUs.

Rational for Indicator 1: The NRLMD standards and guidelines contribute to the conservation and recovery of Canada lynx. If vegetation that contributes to lynx habitat is not within a LAU the standards and guidelines will not be applied and adverse effects could occur to lynx, its habitat, and the habitat of snowshoe hare.

Measure for Indicator 1: The amount of primary and secondary vegetation within LAUs.

Indicator 2: LAUs are delineated consistent with the NRLMD EIS and LCAS 2nd Edition.

Rational for Indicator 2: If LAUs are delineated consistent with the NRLMD FEIS and LCAS the NRLMD standards and guidelines that contribute to the conservation of lynx would be implemented appropriately.

Measure for Indicator 2: Percentage of LAUs that are delineated consistent with the NRLMD EIS and LCAS.

Indirect Effects

Alternative 1 – No Action

Under the No Action alternative the Targhee NF does not have LAUs that have been vetted or analyzed under NEPA, as required by the Court Order. However, primary and secondary vegetation have been estimated and identified on the Targhee NF according to the direction and criteria provided by NRLMD and 2000 LCAS. Under this alternative 544,632 acres of primary and secondary vegetation are estimated on the Targhee National Forest (Table 3.1). Below are the two indicators that measure the programmatic effect of LAU delineations have on lynx, its habitat, and the habitat of snowshoe hare.

Indicator 1: Changes in the amount of vegetation that contributes to lynx habitat within LAUs.

There is no primary or secondary vegetation within LAUs under the no action alternative, therefore, no lynx habitat identified.

Indicator 2: LAUs are delineated consistent with the NRLMD EIS and LCAS 2nd Edition.

No (0%) LAUs are delineated under the no action alternative, therefore, there are no LAUs delineated consistent with the NRLMD EIS Appendix B and LCAS.

Under this alternative, NRLMD standards and guidelines would not be applied and consistent effects analysis for project planning would not be possible until LAUs were vetted through the NEPA process. No effects can be disclosed under this alternative because LAUs are not delineated and the NRLMD standards and guidelines could not be applied.

Table 3.1: No Action Alternative - Primary Vegetation, Secondary Vegetation, and Lynx Habitat Acres

LAUs	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Total Primary and Secondary (Acres)	Lynx Habitat (Acres)
No LAUs	498,548	46,084	544,632	0

Alternative 2 – Proposed Action

Under alternative 2, primary and secondary vegetation have been estimated and identified on the Targhee NF according to the direction and criteria provided by NRLMD and 2000 LCAS. Under this alternative 544,632 acres of primary and secondary vegetation are estimated on the Targhee National Forest (Table 3.3). Below are the two indicators that measure the programmatic effect of LAU delineations have on lynx, its habitat, and the habitat of snowshoe hare.

Indicator 1: Changes in the amount of vegetation that contributes to lynx habitat within LAUs.

Under this alternative, approximately 474,440 acres of primary vegetation and 40,701 acres of secondary vegetation would be within LAUs and therefore a total of 515,141 acres would be identified as lynx habitat (Table 3.3).

Indicator 2: LAUs are delineated consistent with the NRLMD EIS and LCAS 2nd Edition.

Under this alternative, 24 LAU boundaries are delineated. All (100 percent) of the LAUs are delineated consistent with the criteria and procedures identified in the NRLMD EIS -Appendix B and 2000 LCAS.

Approximately 24,108 acres of primary vegetation and 5,383 acres of secondary vegetation fall outside of the 24 LAU boundaries (Table 3.3).

The LAUs delineated in this alternative apply the NRLMD standards and guidelines appropriately to the entire available potential lynx habitat available on the Targhee National Forest. LAUs delineated would allow effects to be assessed for project activities effects on lynx. This alternative would meet the intent of the NRLMD of contributing to the conservation and recovery of Canada lynx because all the vegetation that contributes to lynx habitat has the NRLMD standards and guidelines applied and LAUs delineated meet the criteria and procedures disclosed in the NRLMD EIS. Project activities would assess the effects to lynx adequately since the analysis boundaries are delineated consistent with the NRLMD EIS and 2000 LCAS.

The effects of applying the NRLMD standards and guidelines to lynx, its habitat, and the habitat of snowshoe hare would be consistent with the analysis disclosed in the NRLMD EIS. This alternative would have the same effect to lynx as was disclosed in the

NRLMD EIS because more than 95% of the vegetation (amount, patch size, inter-patch distance of primary and secondary vegetation) that contributes to lynx habitat would be within an LAU. Since the LAUs were delineated consistent with the NRLMD EIS and 2000 LCAS, and these were the assumptions in the NRLMD EIS, the analysis and disclosure of effects to lynx, its habitat, and the habitat of snowshoe hare is consistent with the NRLMD EIS and therefore also the Targhee RFP.

Table 3.2: Alternative 2 - Targhee NF 2014 LAU Boundaries Primary Vegetation, Secondary Vegetation, and Lynx Habitat Acres

LAU #	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Lynx Habitat (Acres)
1	16,788	5,914	22,702
2	32,497	8,694	41,191
3	18,347	189	18,536
4	11,120	2,387	13,507
5	28,065	3,568	31,633
6	19,716	2,674	22,390
7	24,491	1,741	26,232
8	24,621	2,332	26,953
9	29,035	1,692	30,728
10	17,638	403	18,042
11	13,276	1,157	14,433
12	37,531	1,873	39,404
13	15,184	2,066	17,249
14	29,234	544	29,778
15	16,222	74	16,296
16	17,699	170	17,868
17	12,171	0	12,171
18	14,953	147	15,100
19	17,355	796	18,150
20	8,060	742	8,801
21	16,654	973	17,628
22	15,183	58	15,241
23	27,768	1,160	28,927
24	10,833	1,347	12,180
Total	**474,440**	**40,701**	**515,141**

Table 3.3: Alternative 2 – Targhee NF 2014 LAU Acreage Totals

	Primary Vegetation (Acres)	Secondary Vegetation (Acres)	Total Primary and Secondary (Acres)	Lynx Habitat (Acres)
Totals Acres	**498,548**	**46,084**	**544,632**	**N/A**
Acres Inside LAUs	474,440	40,701	515,141	515,141
Acres Outside LAUs	24,108	5,383	29,491	0

Cumulative Effects

The analysis area for this effects analysis is the entire Targhee NF. The following five anthropogenic activities have the potential to permanently remove primary and secondary vegetation: highways/transportation; mineral development; special use authorizations; land ownership changes; and climate change (ILBT 2013). Permanent changes to the identified primary and secondary vegetation, even those of incremental nature, could ultimately lead to reconsideration of LAU boundary configuration on the Forest. However, there are currently no reasonably foreseeable actions, specifically highway/transportation development, mineral development, special use authorizations[34], land ownership changes, or imminent climate change issues, that would alter the amount and location of primary and secondary vegetation on the Targhee NF. Therefore, there are no cumulative effects to consider in this analysis.

Other Resources Considered

The following resources were considered in this programmatic analysis: fire; forests; other wildlife and plants/threatened and endangered species; range; recreation; economic and social; hydrology; fisheries; air; cultural resources; caves; soils; roadless/wilderness; and scenery (see Project Record, Specialist Reports). However, the criteria for delineating LAUs do not include the consideration of any of these resource areas (USDA FS, NRLMD FEIS 2007). Further, these resource areas have no bearing on the presence or absence of primary and secondary vegetation, as they do not lead to permanent fragmentation of lynx habitat (ILBT 2013). Therefore, the consideration of these resource areas provides no basis for the programmatic decision in consideration.

Short-term Uses and Long-term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101, 42 U.S.C. §4331).

A selection of the action alternative would result a decision establishing LAU boundaries for the Targhee NF. This programmatic decision would establish the boundaries that will be used to analyze the project-specific impacts to lynx. This decision neither authorizes nor prohibits short-term uses on NFS lands. Any future authorizations of short-term use that are reliant on this programmatic decision would involve additional environmental analysis. At that point, each specifically identified project would evaluate and disclose the potential long-term effects on productivity of each environmental resource area.

[34] Specifically, there are no reasonably foreseeable special use authorizations of the type that could or would alter the amount and location of primary and secondary vegetation on the Targhee NF. There are currently other special use authorizations occurring and anticipated on the Targhee NF; however, none of these would alter the amount of primary and secondary vegetation on the Forest.

The proposed action, if selected, is consistent with the Targhee RFP, as amended by the NRLMD. The Targhee RFP, which adheres to the principles of the Multiple-Use Sustained-Yield Act of 1960, provides guidance for a sustainable flow of goods and services while maintaining the productivity of the land.

Unavoidable Adverse Effects

The selection of the action alternative would represent a programmatic decision establishing the LAU boundaries on the Targhee NF that will be used to analyze project-specific impacts to lynx. This decision does not authorize any activities or uses on NFS lands; therefore this decision will not dictate the activities that would occur or not occur on NFS lands. Accordingly, the alternatives do not have energy requirements or energy conservation potential, and they do not have natural or depletable resource requirements. As previously discussed, each alternative has merits and trade-offs related to the issues.

However, none of the alternatives would result in any unavoidable adverse effects on the human environment.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road. Neither the proposed action nor the no action alternatives would itself be an irreversible or irretrievable commitment of resources, nor would it cause such commitments. Rather, the proposed action merely establishes the analysis boundaries for project-specific impacts to lynx. Any commitments of resources would take place when projects or activities are proposed, their effects are analyzed in the appropriate NEPA process, consistency with the applicable land management plan is determined, and the project or activity is authorized.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders."

National Forest Management Act

The Proposed Action fully complies with the 1997 Revised Forest Plan for the Targhee Forest National Forest, as amended by the NRLMD. The Proposed Action incorporates all applicable Forest Plan forest-wide standards and guidelines and complies with Forest Plan goals and objectives. All required interagency reviews and coordination has been accomplished; new or revised measures resulting from these reviews have been incorporated.

Endangered Species Act

The Endangered Species Act (7 U.S.C .136; 16 U.S.C. 1531 et seq.) and 50 CFR 402 apply to federal lands and direct federal agencies to use their authorities to carry out conservation programs for listed species. The Endangered Species Act (ESA) directs federal agencies to make sure their actions are not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of critical habitat. Under ESA, Canada lynx is listed as a threatened species, and is the focus of this proposed management direction. Consultation with the U.S. Fish and Wildlife Service on the Biological Assessment will be completed prior to the release of the Final EIS. All comments received during consultation will be considered in the final environmental analysis.

National Historic Preservation Act

The selection of the action alternative would represent a programmatic decision establishing the areas on the Targhee NF where the NRLMD standards and guidelines will be applied. This decision does not authorize any activities or uses on NFS lands; therefore this decision will not dictate the activities that would occur or not occur on NFS lands. Compliance with the National Historic Preservation Act would occur at the project level.

Executive Order 12898 (Environmental Justice)

The Caribou-Targhee NF has considered input from all persons and groups, regardless of age, race, income status, or other social and economic characteristics. No civil rights effects associated with age, race, creed, color, national origin, or gender have been identified.

During the course of this analysis, potential impacts to minority populations were considered. Tribes with aboriginal territories in the analysis area were identified and contacted both formally and informally, and were given the opportunity to review and comment during this preparation of this DEIS. No comments were received that identified any minority populations that could be unequally affected.
Based on the analysis presented in the DEIS, none of the alternatives considered would result in any identifiable effects or issues specific to any known minority or low-income population or community.

Chapter 4. Preparers and Contributors

The interdisciplinary team is made up of core members and contributing members. The core members were involved in all steps of the NEPA process. Core members' names and titles are italicized. Contributing members are generally less involved in process; providing background information and analysis for their area of expertise only, for example. The Caribou-Targhee NF Leadership Team also contributed information and decided upon the preferred alternative.

Interdisciplinary Team Members

Doug Herzog - Interdisciplinary Team Leader, Forest Planner

Tom Silvey – Supervisory Forester

Diane Probasco – Wildlife Biologist

Rose Lehman - Botanist

Heidi Heyrend – Range Specialist/Natural Resource Specialist

Kaye Orme – Supervisory Natural Resource Specialist

Louis Wasniewski – Forest Hydrologist

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Forest Leadership Team Members:

Robbert Mickelsen – Ecosystem Branch Chief

Garth Smelser – Forest Supervisor

The Caribou-Targhee NF consulted with and/or requested input from the following Federal, State, and local agencies, tribes and other organization and individuals during the development of this environmental impact statement:

Federal, State, and Local Agencies

Environmental Protection Agency – Region VIII, EPR-N and Region X

Wyoming State Historic Preservation Office

Wyoming State Forestry Office

Wyoming Office of State Lands and Investments

Wyoming Governor's Planning Office

Department of Agriculture, N.R.D.

Wyoming Department of Game and Fish

Wyoming Department of Travel and Tourism

U.S. Fish and Wildlife Service

Wyoming State Geological Survey

Teton County Commissioners - Wyoming

U.S. Forest Service, Bridger-Teton National Forest

U.S. Department of Agriculture – APHIS ADC

Bannock County Land Development – Idaho

Idaho State Department of Agriculture

Idaho Department of Fish and Game

Power County Commission – Idaho

Bingham County Commission - Idaho

U.S. Department of the Interior, Bureau of Land Management

Idaho Department of Lands

Idaho Department of Parks and Recreation

Bonneville County Commissioners - Idaho

Idaho Department of Environmental Quality

Idaho State Department of Water Resources

Fremont County Parks and Recreation – Idaho

Clark County Commissioners - Idaho

Island Park Chamber of Commerce - Idaho

Madison County Commissioners - Idaho

Fremont County Commissioners - Idaho

Fremont County Planning and Zoning Commission - Idaho

Idaho State Clearinghouse – Division of Budget, Policy, Planning and Coordination

Bear Lake Regional Commission – Utah

Office of the Governor - Utah

Tribes

During the original scoping period, in March 2013, the C-TNF requested comments and input from the Shoshone-Bannock Tribes. No comments were received at that time. However, this DEIS will be made available to the Shoshone-Bannock Tribes and formal government-to-government consultation will be offered prior to the release of the Final EIS.

Glossary

Climax community – The culminating stage in plant succession for a given environment that develops and perpetuates itself in the absence of disturbance (Steele et al 1983).

Community (plant community) – An assembly of plants living together, denotes no particular ecological status. The basic unit of vegetation (Steele et al 1983).

Community type – A classified plant community distinguished by various criteria, may be seral or climax (Steele et al 1983).

Cover type- The present vegetation composition of an area, described by the dominant plant species (LCAS 3rd edition).

Ecological type – A category of land defined for a unique combination of vegetation, soil, topography, geology and climate (USDA FS 1999).

Ecological unit – A mapped delineation of one or more ecological type, mosaic, or ecotone as they are found in a repeating pattern across the landscape (USDA FS 1999).

Habitat type – An aggregation of all land areas potentially capable of producing similar plant communities at climax (Steele et al 1983).

Inclusions – Areas where the soils, vegetation or landform position differ significantly from the named ecological unit components. They are often ecological types, mosaics, ecotones or miscellaneous areas from adjacent ecological units (USDA FS 1999).

LAU (Lynx Analysis Units) – An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (Ruediger et al. 2000). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant (USDA FS, NRLMD ROD 2007).

Lynx Analysis Unit (LAU) – Landscape units that approximate the size of a female lynx annual home range (appropriate to the Geographic Area) and encompass all seasonal habitats. These may also contain areas of non-lynx habitat, such as open meadows, especially in mountainous regions. An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant (ILBT 2013).

Lynx habitat – Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat generally occurs between 3,500 and 8,000 feet of elevation, and primarily consist of lodgepole pine, subalpine fir, and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas-fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Dougals-fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forest do not provide lynx habitat (Ruediger et al. 2000; USDA FS, NRLMD ROD 2007).

Lynx habitat – Boreal forest with gentle rolling topography, dense horizontal cover, deep snow, and moderate to high (>0.5 hares/ha [0.2 hares/ac]) snowshoe hare densities. In the northeastern United States, lynx habitat includes coniferous and mixed-coniferous/deciduous forests dominated by white, black, and red spruce, balsam fir, pine, norther white cedar, hemlock, sugar maple, aspen, and paper birch. In Minnesota, lynx habitat includes coniferous and mixed-coniferous/deciduous vegetation types dominated by pine, balsam fir, black and white spruce, northern white cedar, tamarack, aspen, and paper birch. In the western United States, forest cover types dominated by Engelmann spruce, subalpine fir and lodgepole pine provide habitat for lynx (ILBT 2013).

Mapping segments – Polygonal segments or modeling units that generally represent discrete areas or objects on a landscape generated from partitioning digital imagery (USDA FS 2014).

Occupied – An area is considered occupied by lynx when:

1. There are at least two verified lynx observations or records since 1999 on the national forest unless they are verified to be transient individuals; or
2. There is evidence of lynx reproduction on national forest.

Persistent community types – Communities that frequently persist for long periods of time and in some cases appears to be climax (Bradley et al. 1992).

Potential vegetation type – The community of plants that would become established if all successional sequences were completed, without interference by humans, under existing environmental conditions at the site including soils, topography, and climate. Potential vegetation types are typically named by using one or more species from the dominant (overstory) vegetation layer and one or more indicator plants form the subordinate (undergrowth) layer (e.g., subalpine fir/grouse huckleberry or ABLA/VASC). (IBLT 2013).

Primary vegetation – Subalpine fir habitat types dominated by cover types of spruce/fir, Douglas-fir, and seral lodgepole pine (USDA FS, NRLMD EIS, Appendix B 2007).

Secondary vegetation – Cool, moist habitat types (e.g., some Douglas-fir, grand-fir) that may contribute to lynx habitat where they are intermingled with and immediately adjacent to primary vegetation (USDA FS, NRLMD EIS, Appendix B 2007).

Seral – A species or community that is replaced by another species or community as succession progresses (Steele et al. 1983).

Succession – The progressive changes in plant communities toward climax, with qualification, may refer to progressive changes in a direction other than climax.

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Appendix A: Lynx Habitat Mapping Process

Targhee National Forest

Updated 7/15/15

The 2000 Lynx Conservation Assessment and Strategy (LCAS) and Northern Rockies Lynx Management Direction (NRLMD) outlined a number of criteria that should be considered in the mapping of lynx habitat and the identification of Lynx Analysis Units (LAUs). This paper describes the procedures, assumptions, and information used to develop lynx habitat, LAUs, and linkage areas on the Targhee National Forest.

Background

The Caribou-Targhee has previously mapped lynx habitat on the Targhee portion of the Forest. The first mapping effort was completed in 2001. This mapping effort followed the guidance from the 2000 LCAS recommendations for mapping lynx habitat. In 2003, an Interagency Lynx Coordination Meeting was held in Island Park, Idaho. Several recommendations and studies were recommended which focus on the mapping of subalpine fir habitat types and there relation to dry, persistent lodgepole pine community types. In 2005, new mapping was conducted on the forest based on the new studies and models discussed at the coordination meeting. Based on the models, the amount of vegetation contributing to lynx habitat was significantly reduced primarily based on upon the reclassification of subalpine fir habitat types supporting a dry, persistent lodgepole pine community type. Additional evaluation of vegetation contributing to lynx habitat and additional remapping occurred in the Centennials and Caribou ecological subsections. In 2012, a court decision concluded that the 2005 LAUs needed to be vetted under NEPA. In 2013, a reevaluation of the mapping of vegetation that contributes to lynx habitat was undertaken. This paper documents this process of estimating vegetation that contributes to lynx habitat on the Targhee National Forest.

Vegetation Characteristics of Lynx Habitat

According to the NRLMD, lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. For the western US, which is where the Targhee portion of the Caribou-Targhee is located, mesic coniferous forest are subalpine fir habitat types dominated by cover types of spruce/fir, Douglas-fir, and seral lodgepole pine. These types are considered primary vegetation and necessary to support foraging, denning, and rearing of young for lynx. Cool, moist Douglas-fir habitat types may contribute to lynx habitat where they are intermingled with and immediately adjacent to primary vegetation. These types are considered secondary vegetation. Dry habitat types such as dry Douglas-fir and dry or climax lodgepole pine do not appear to be associated with lynx and should not be identified as lynx habitat (USDA FS, NRLMD EIS 2007).

Lynx occurrence records of all types have been considered in determining vegetation and areas that contribute to lynx habitat. The 2013 LCAS identifies the Targhee NF as secondary areas for lynx conservation. In these areas it states that "historical information suggest lynx were much less likely to occupy these areas over time…(ILBT 2013, p. 88) and speculates that the amount and quality of habitat required to support an independent adult or subadult disperser is less than

as necessary to support reproduction and sustain a local population." Based on occurrence records and the lack of evidence of lynx reproduction this was not useful in revealing habitats that are important to lynx on the Targhee NF. The occurrence records and 2013 LCAS suggest that the Targhee NF does not have vegetation characteristics to support lynx reproduction or sustain a local population; therefore the Targhee NF has no important habitat types important to lynx for reproduction. While peripheral and secondary areas are patchier and less productive then core areas, they might contribute to lynx persistence by supporting successful dispersal or exploratory movements (ILBT 2013). The secondary areas, as found on the Targhee NF, may support snowshoe hare resources for lynx that infrequently may move through or reside temporarily in the area and could be important in maintaining or enhancing genetic diversity (ILBT 2013).

Primary Vegetation

The NRLMD considers primary vegetation as subalpine fir habitat types. To be consistent with the NLRMD primary vegetation was identified as subalpine fir habitat types on the Targhee National Forest. Habitat types according to Steele et. al. 1983 are "an aggregation of all land areas potentially capable of producing similar plant communities at climax." Using the criteria in the NLRMD EIS, the Classification of Forest Habitat Types for Lynx Habitat on the Targhee National Forest section of this document displays what habitat types are considered primary vegetation on the Targhee National Forest. There are several subalpine fir habitats that were not classified as primary vegetation and are identified as sustaining a persistent dry lodgepole pine community type which does not meet the definition of primary vegetation. These habitat types were identified as dry habitat types or dry lodgepole pine and should not be identified as lynx habitat according to the NLRMD. These habitat types will be discussed under "Dry Forest Habitat Types".

Engelmann spruce habitat types were also considered as primary vegetation. These habitat types were identified as primary vegetation because they occur on wet cold sites and are intermingled with subalpine fir habitat types and hard to distinguish from a subalpine fir habitat type. Engelmann spruce habitat types are usually associated with riparian areas on the Targhee National Forest. This habitat type on the Targhee National Forest is a minor component of primary vegetation. The Engelmann spruce/ common juniper habitat type was not considered primary vegetation. This habitat type is typically associated along non-forest types and considered very dry and was not considered primary vegetation. In areas where Engelmann spruce habitat types are on the lower elevations or south facing slopes and are not intermingled with subalpine fir habitat types, these areas would be considered secondary vegetation and most likely isolated stringers within riparian areas.

Secondary Vegetation

The NLRMD states that only cool moist habitat types should be considered secondary vegetation. To identify Douglas-fir habitat types that are cool moist on the Targhee National Forest, Fire Groups as described by Bradley et. al. 1992 was used. Douglas-fir habitat types in Fire Group 3 are considered cool moist Douglas-fir habitat types on the Targhee National Forest. Bradley et. al. 1993 describes them as "relatively moist Douglas-fir habitat types". This coincides with the definition of secondary vegetation in the NLMRD. The Classification of Forest Habitat Types for Lynx Habitat on the Targhee National Forest section lists those habitats

on the Targhee NF that are considered secondary vegetation. NLMRD states that secondary vegetation may contribute to lynx habitat where it is intermingled with and immediately adjacent to primary vegetation. To capture the ecotones between primary and secondary vegetation, it was determined that approximately 200 meter buffer around primary and secondary vegetation would be used to estimate the amount of secondary vegetation that contributes to lynx habitat. Secondary vegetation outside of that area would not be considered as intermingled or adjacent and therefore would not contribute to lynx habitat. At a site specific level analysis the ecotone between primary and secondary vegetation could be smaller or wider depending on variables such as topography (slope, aspect, elevation, etc.) and/or soil characteristics. It is expected that site specific analysis will adjust the amount of secondary vegetation that contributes to lynx habitat based on site specific variables.

Dry Forest Habitat Types

Other forested habitat types not identified as primary or secondary vegetation are not to be identified as vegetation contributing to lynx habitat. However, it is recognized that other forested habitat types will be used by lynx primarily to move among primary and secondary vegetation. The Classification of Forest Habitat Types for Lynx Habitat on the Targhee National Forest section below documents dry forest habitat types that do not contribute to lynx habitat because they are not necessary to support lynx reproduction or survival (Ruediger et. al. 2000).

As previously noted, several subalpine fir habitat types have not been classified as primary vegetation because they support a dry persistent lodgepole pine community types. According to the NLRMD dry or climax lodgepole pine should not be identified as lynx habitat. Previous lynx mapping efforts did not consider these habitat types as dry lodgepole pine types. Additionally, hare surveys that were conducted tended to demonstrate low populations of hares in the Island Park area. Lynx habitat mapping in Yellowstone National Park determined that areas around the Madison-Pitchstone plateau should not be mapped due to supporting a dry persistent lodgepole pine community types.

Due to these issues an Interagency Lynx Coordination Meeting was held in Island Park, Idaho, to discuss lynx habitat mapping and snowshoe hare information for the Caribou-Targhee in 2003. After this meeting several recommendations were developed. One of the recommendations was to review and evaluate some subalpine fir habitat types that appeared to be dry, persistent lodgepole pine stands even though the area can sustain 6-12 feet of snow during the winter. Steele et. al. 1983 describes these dry persistent lodgepole pine stands as community types. A full list of those types is listed in the Classification of Forest Habitat Types for Lynx Habitat on the Targhee National Forest section. To determine the potential extent of these persistent lodgepole pine types, Dr. McKelvey and Greg McDaniel developed a field sampling methodology to obtain the presence of subalpine fir for the Centennial Mountains and the Plateau area. Based on this study it was concluded that continuous areas of subalpine fir were not evident across the East Plateau. The habitat type that occurs in this area is primarily subalpine fir/grouse whortleberry. It was also concluded from this study "that there is little evidence that subalpine fir can grow in these sites, and even a less evidence of a successional trajectory leading to subalpine fir dominance (McDaniel and McKelvey 2004b)." Despain 1990 also recognized

some subalpine fir habitat types within the Yellowstone area supporting a dry persistent lodgepole pine community types. Subalpine fir/grouse whortleberry and subalpine fir/pinegrass habitat types typically support these conditions. These habitat types commonly occur on coarse volcanic, infertile, droughty soils (rhyolite soils) which provide poor growing conditions for subalpine fir. Bradley et. al. 1992 recognized lodgepole pine community types as a fire group five and states "persistent lodgepole pine develop in acidic soils made up of coarse, alluvial material derived from rhyolite, sandstone, or granitic rock on sites with gently sloping to nearly level topography. Drought or nutrient stress may inhibit competition from other conifers. These type of soil conditions occur within Island Park and Madison Pitchstone plateau areas of the Targhee. To illustrate these typical persistent dry lodgepole pine community types photo points from forest inventory plots in the Island Park and Madison Pitchstone Plateau ecological subsections are included below. These photos show mature stands with an almost nonexistent understory of subalpine fir and provide little horizontal cover. Based on all this information and studies, subalpine fir habitat types that support a dry persistent lodgepole pine community type were not included as primary vegetation contributing to lynx habitat and meet the criteria of the NLMRD of dry forest habitat types.

According to the NRLMD, dry Douglas-fir habitat types should not be identified as lynx habitat. Dry Douglas-fir habitat types were determined using fire groups as described in Bradley et. al. 1992. Douglas-fir habitat types that occur in Fire Group 2 were determined to meet the dry forest habitat types criteria in the NRLMD. According to Bradley et. al. 1992, Fire Group 2 is composed of cool, dry, relatively unproductive Douglas-fir habitat types. Limber pine habitat types are considered dry forest habitat types and are part of Fire Group 1. Limber pine habitat types occur on drier sites and sometimes are an ecotone to non-forested types such as sagebrush. Whitebark pine habitat types are relatively rare on the Targhee National Forest. These sites occur primarily on very cold and harsh sites too severe for subalpine fir or Engelmann spruce (Steele et. al. 1993) habitat types. On the Targhee National Forest, whitebark pine trees are primarily successional species in subalpine fir habitat types.

High elevation tree patches or krummholz tree patches scattered and intermingled with rock, barren areas or alpine vegetation are also considered areas of dry forest habitat types.

Non-forested habitats

Non-forested habitats are not identified as vegetation contributing to lynx habitat. It is recognized that lynx may use these areas to travel between patches of lynx habitat and may provide important foraging areas for lynx and their prey species.

Mapping Primary and Secondary Vegetation

To establish where lynx habitat is distributed across the Targhee National Forest it is necessary to map primary and secondary vegetation. The Targhee National Forest Ecological Unit Inventory (TNFEUI) (1999) was used to map where primary and secondary vegetation occurs. This inventory defined ecological types[35] and delineated ecological units. An ecological type is a category of land defined for a unique combination of vegetation, soil, topography, geology and

[35] Ecological type: a category of land defined for a unique combination of vegetation, soil, topography, geology and climate (USDA FS TNFEUI 1997).

climate. Where ecological types are difficult to define, mosaics or ecotones were used. An ecological unit is the mapped delineation of one or more ecological type, mosaic or ecotone as they are found in a repeating pattern across the landscape. Ecological types are identified by a vegetation and soils component. This vegetation component of ecological type uses the potential natural community. A potential natural community is the biotic community that would be established and maintained over time under present environmental conditions if successional sequences were completed without additional human-caused disturbance. The TNFEUI used Steele et. al. (1983) to identify potential natural community types (habitat types) across the Targhee NF. Primary and secondary vegetation is defined by habitat types so the TNFEUI is currently the best source of information to use to map lynx habitat across the Targhee National Forest. There are limitations to using this data due to the mapping of ecological units and the complexities of where habitat types occur at a 1:24000 scale. However, it has provided an initial estimate of primary and secondary vegetation and may be refined as new site specific information becomes available.

The Classification of Ecological Units for Lynx Habitat on the Targhee National Forest section of this Appendix documents how each ecological unit was classified as primary or secondary vegetation. As the table indicates several ecological units have primary and secondary vegetation classified. This is because in each ecological unit there may be several inclusions or habitat types that occur which are primarily defined by the aspect or slope. The "Remarks" column describes how vegetation was identified within the ecological unit. The TNFEUI ecological units are stored as a GIS coverage in the Caribou-Targhee GIS database.

TNFEUI ecological units, were stratified, since it contains non-forested and forested vegetation. Beginning in 2011, an existing vegetation layer was being developed for the Caribou-Targhee. Part of this process "mapping segments" (GIS polygons) were developed from a combination of spectral information and physical characteristics of the landscape using high resolution aerial imagery collected in 2009. These mapping segments were used as a stratification to determine forested and non-forested condition and used to attribute the polygons meeting primary or secondary vegetation. Other GIS layers (i.e. vegetation GIS layers) were considered; however, the 2011 "mapping segments" were more refined to allow for more detailed mapping of primary and secondary vegetation.

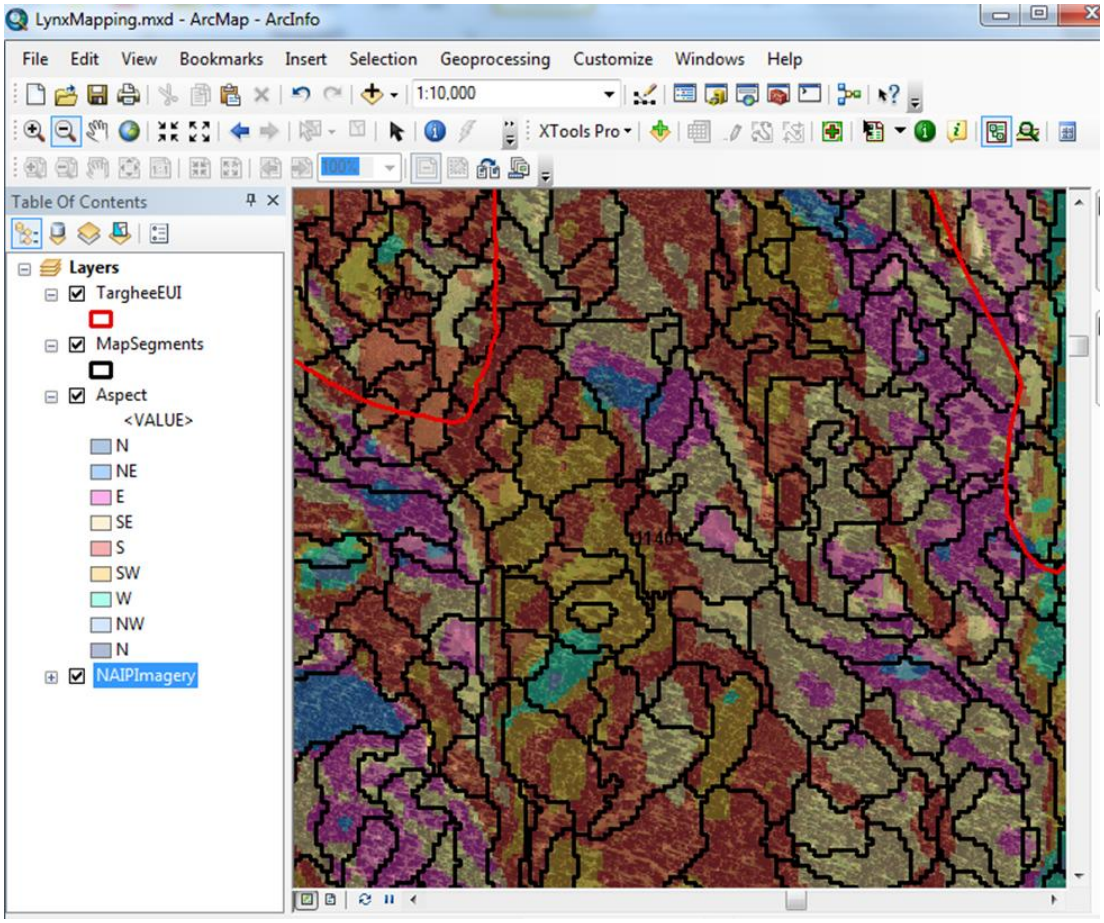

Figure 2 Example of evaluating mapping segments with TNFEUI, aspect, and high resolution imagery using GIS software.

Due to the nature of classifying polygons into a forested or non-forested condition and potential vegetation, limited information was available to automate this process. It was decided, due to the complexity of the mapping segments that each mapping segment would be classified by a vegetation specialist to determine if the segment was primary, secondary, or non-lynx vegetation. Aspect and slope GIS layers were used that were developed using 10 meter digital elevation models (DEM). This was combined with the high resolution imagery taken in 2009 and 2011 and the TNFEUI ecological unit GIS coverage. Each mapping segment was evaluated first to determine if it was forested or non-forested condition. If the mapping segment met the forested condition then it was determined where the majority of the segment intersected the TNFEUI ecological unit. Based on the TNFEUI ecological description, the segment was evaluated on the majority of the aspect and slope. Using this system primary vegetation was identified first. Secondary vegetation was identified using the same techniques but only within approximately 200 meters of primary vegetation segments. Figure 1 is a snapshot of a typical area being evaluated for primary and secondary vegetation.

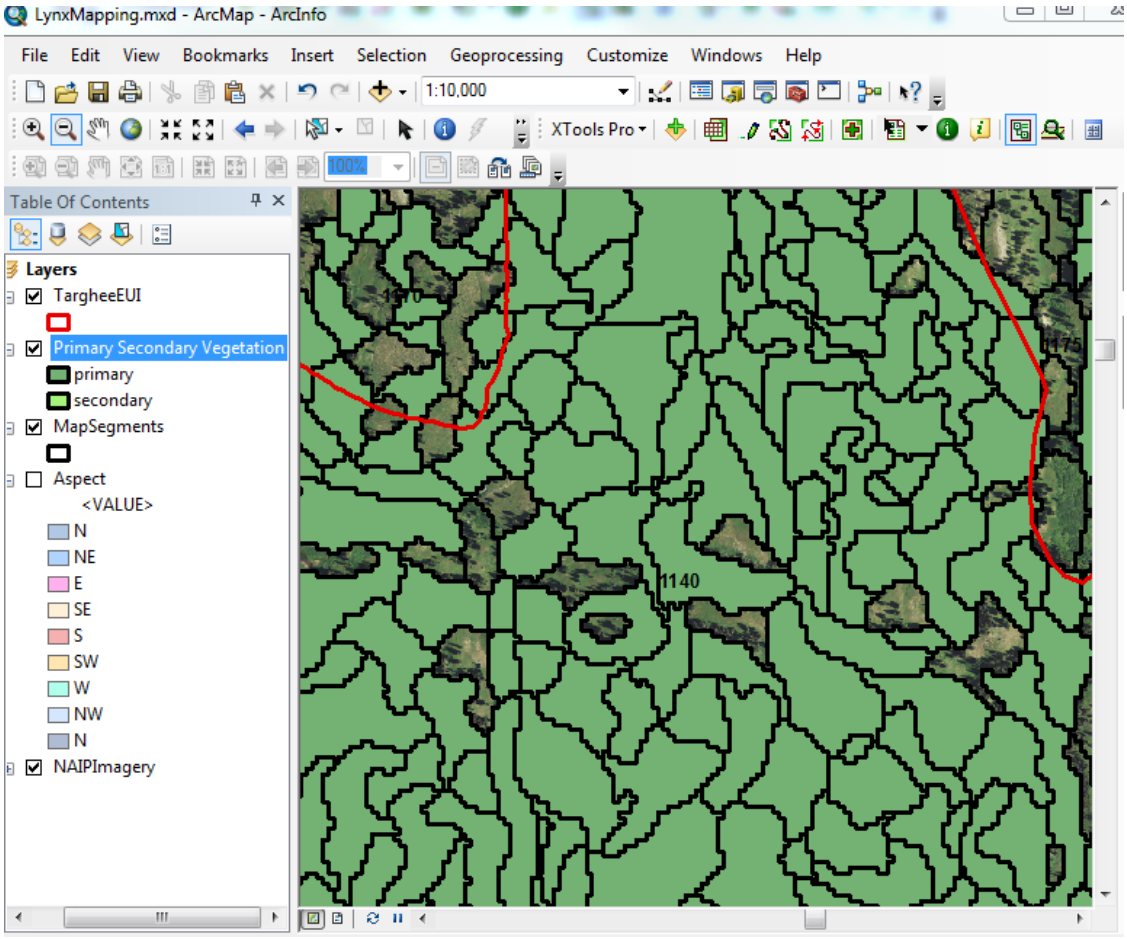

Figure 3 Example of attributing mapping segments as primary and secondary vegetation using GIS software.

Once all the map units were attributed as primary and secondary vegetation then these map units were dissolved into blocks of primary and secondary vegetation. Blocks that were less than 5 acres in size were removed since the minimum mapping feature area for watershed or project areas is 5 acres (Brohman and Bryant 2005). Figure 2 is an example snapshot of polygons that have been attributed meeting primary or secondary vegetation.

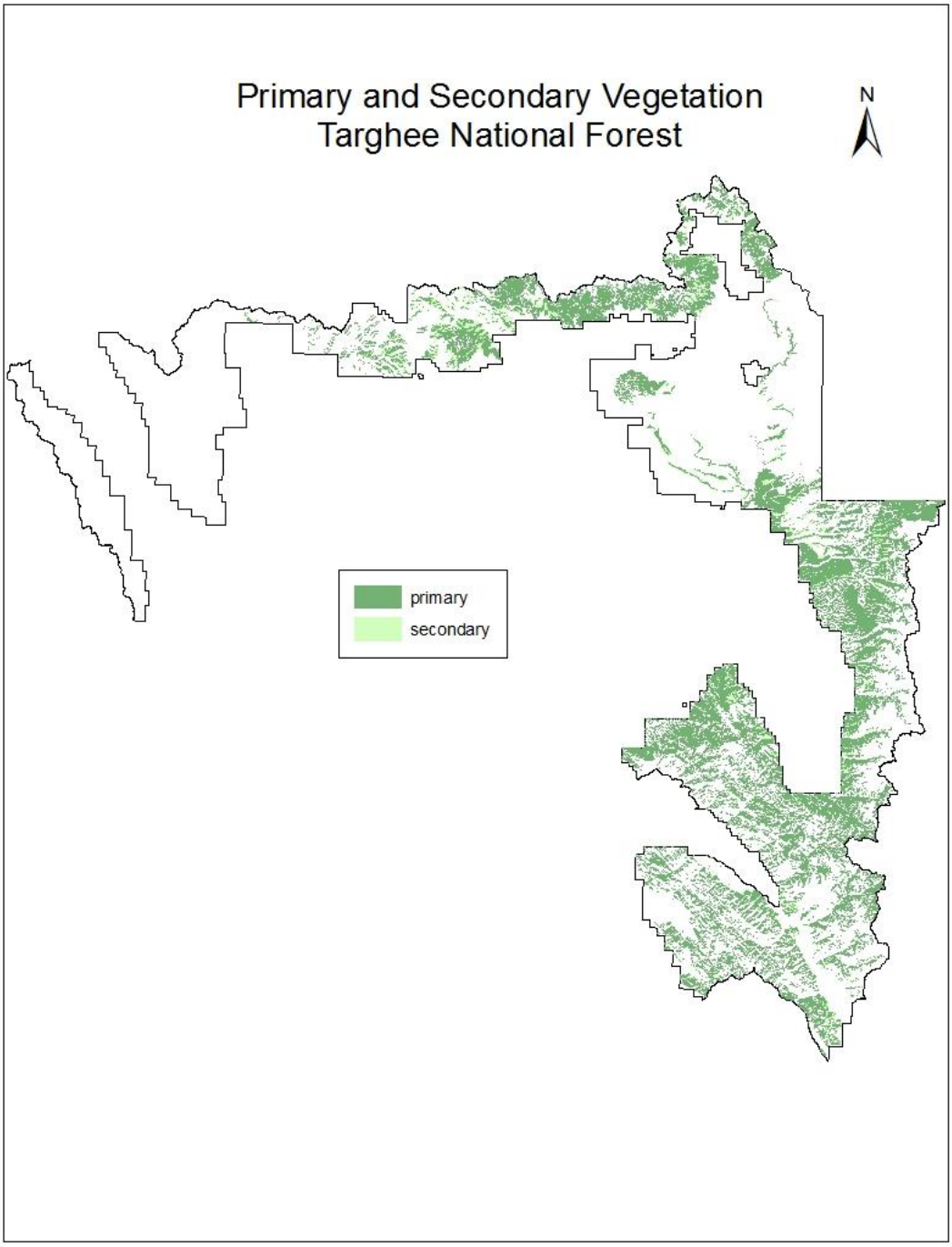

Figure 4 Map shows primary and secondary vegetation that was mapped on the Targhee National Forest.

Figure 3 shows primary and secondary vegetation that was mapped on the Targhee National Forest using the techniques described above.

Mapping Lynx Habitat and LAUs

Once primary and secondary vegetation was identified the next step was delineate Lynx Analysis Units (LAUs). An LAU is a unit for which the effects of a project would be analyzed for lynx. An LAU should be at least the size used by an individual lynx, from about 25 to 50 square miles. Figure 3 demonstrates that primary and secondary vegetation is scattered and not contiguous on many portions of the Targhee National Forest. The NRLMD and the 2000 LCAS recommends that LAU's should be larger in the southern portions of the Northern Rocky Mountains Geographic Area. To evaluate and determine LAU's on the Targhee National Forest hydrological unit code (HUC) watersheds were used. Fifth code and sixth code HUCs were evaluated to use as the main basis for determining LAU's. Several factors were used in delineating and identifying an LAU. They were:

- At least 10 square miles of primary vegetation needed to be present within an LAU to support survival and reproduction (Ruediger et al. 2000 and ILBT 2013). Areas of less than 10 square miles primary vegetation and were insignificant were discarded.
- The amount and spatial arrangement of vegetation (amount, patch size, inter-patch distance).
- Land ownership patterns.
- Lynx occurrence records. The Targhee National Forest has no verified reproduction of lynx and only records of individual sightings. Very little conclusions could be derived from the current occurrence records.
- Adjacent administrative units LAUs.

Based on these factors Figure 4 shows the LAUs that were delineated based on considering these factors. Due to the spatial arrangement, patch size, etc. of the primary vegetation it was necessary to use other boundaries besides watersheds to delineate the LAU's. In some areas, we used major geographic features such as drainages or ridgelines. In other areas, such as around the Sawtell Peak area in Island Park, we used a major road as a defined boundary. The LAU's delineated match up fairly well to adjacent administrative units, for example neither Yellowstone National Park nor the Targhee identified any LAU's along the western border between them. LAU's were identified along the southern border of Yellowstone National Park and appears to be consistent. Other adjacent units are defined primarily by watershed boundaries and so the identified LAU's appear consistent with the adjacent National Forests.

Very little primary and secondary vegetation was excluded in the delineation of LAUs. Stringers of primary and secondary vegetation were not included within LAUs along the border of the Island Park area and Madison-Pitchstone area. Other stringers along the Henry's Fork were also excluded. These were excluded due to the very narrow and patchiness of the primary vegetation and were too small to make an LAU. The larger patch of primary vegetation around the Bishop Mountain area was excluded due to being an isolated patch or primary vegetation from other more contiguous patches in the Centennial Mountains.

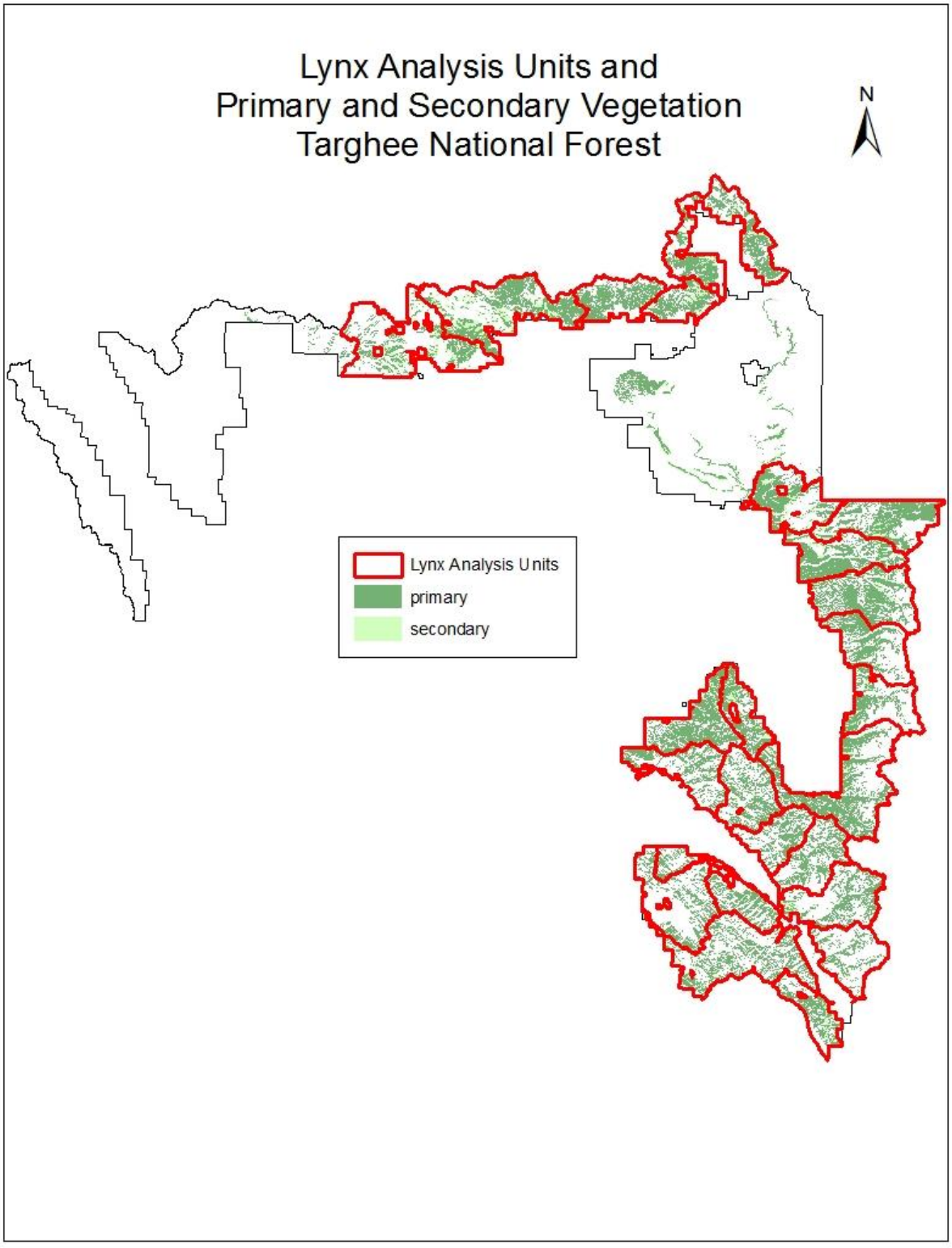

Figure 5 Lynx Analysis Units overlayed on primary and secondary vegetation

Figure 6 Lynx Analysis Units overlayed on primary and secondary vegetation. The Bishop Mountain area was excluded due to not having enough primary vegetation (less than 10 sq. miles). Additionally, this area is isolated and would not be attached with other LAU's which is a consideration in the LCAS. On the western end of the Targhee (west of I-15) small isolated patches that were scattered were excluded due to distance between the patches. Additionally, as site specific analysis is done in the future, it is likely that many of the patches identified in this area may not meet primary vegetation characteristics. Figure 4 displays how the LAUs were delineated over the primary and secondary vegetation that was identified.

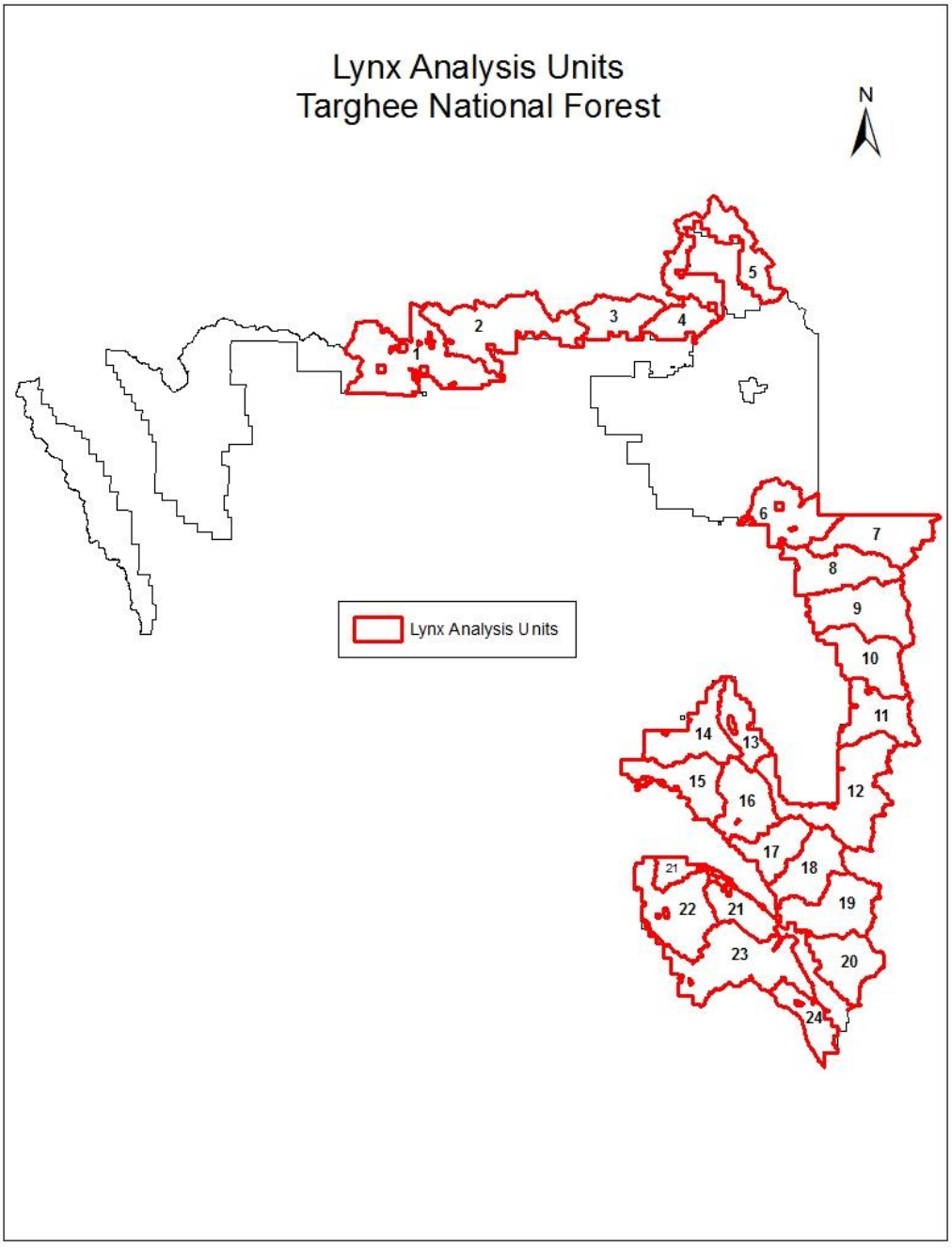

Figure 7 Lynx Analysis Units on the Targhee National Forest.

Twenty-four LAUs were delineated. LAUs ranged in size from 37 to 126 square miles (23,694 to 80,984 acres) of National Forest system lands (see Figure 5). These are larger than the 25 to 50 square miles LAU's found in the more northern geographic range of lynx. Table 1 displays each LAU and how much primary and secondary vegetation is within each LAU.

Table 2 Primary and Secondary vegetation within an LAU and the total lynx habitat.

LAU Name	*LAU Number*	*Total Acres*	*Primary Vegetation*	*Secondary Vegetation*	*Lynx Habitat*
Beaver Creek	1	80,984	16,788	5,914	22,702
Camas Creek	2	73,611	32,497	8,694	41,191
Sheridan Creek	3	32,932	18,347	189	18,536
Coffee Pot	4	23,694	11,120	2,387	13,507
Henrys Lake	5	62,936	28,065	3,568	31,633
Robinson Creek	6	43,867	19,716	2,674	22,390
Upper Falls River	7	48,755	24,491	1,741	26,232
Squirrel Creek	8	43,702	24,621	2,332	26,953
Bitch Creek	9	55,388	29,035	1,692	30,728
Badger Creek	10	42,221	17,638	403	18,042
Teton Creek	11	37,192	13,276	1,157	14,433
Trail Creek	12	78,011	37,531	1,873	39,404
Packsaddle Creek	13	25,793	15,184	2,066	17,249
Canyon Creek	14	43,867	29,234	544	29,778
Dry Canyon	15	41,048	16,222	74	16,296
Pine Creek	16	42,309	17,699	170	17,868
Rainey Creek	17	30,973	12,171	-	12,171
Palisades Creek	18	39,021	14,953	147	15,100
Big Elk Creek	19	49,786	17,355	796	18,150
Indian Creek	20	38,891	8,060	742	8,801
Pritchard Creek	21	39,014	16,654	973	17,628
Fall Creek	22	56,780	15,183	58	15,241
Bear Creek	23	78,036	27,768	1,160	28,927
McCoy Creek	24	24,946	10,833	1,347	12,180
Totals		***1,133,757***	***474,440***	***40,701***	***515,141***

Once all the LAUs were identified and delineated the primary and secondary vegetation within each LAU is then identified as lynx habitat and there is no longer a distinction between primary and secondary vegetation. The standards and guidelines of the NRLMD that state "lynx habitat within lynx analysis units (LAUs)" apply to these areas. Table 1 displays the area and vegetation composition of each LAU that was delineated. The combined total of primary and secondary

vegetation within an LAU is lynx habitat. Figure 6 is the mapped lynx habitat within LAUs on the Targhee National Forest.

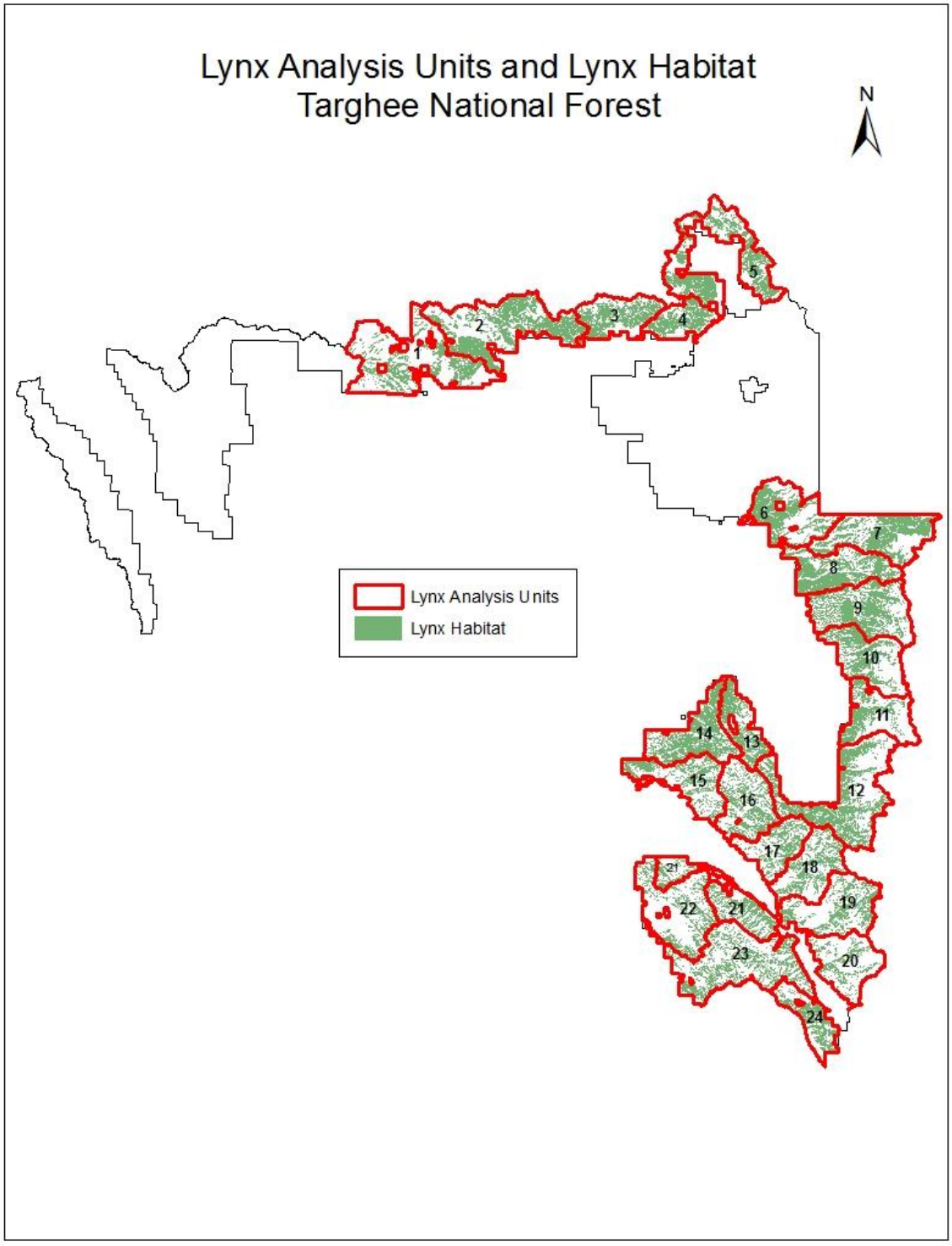

Figure 8 Lynx Analysis Units and lynx habitat on the Targhee National Forest.

The primary and secondary vegetation (lynx habitat) areas are estimates based on the information and data described. It is recognized that the estimates and maps contain errors. It is impossible to create absolutely accurate delineations of vegetation. By nature, vegetation boundaries are likely to be diffuse or fuzzy, rather than sharp and contrasting. The information used provides a good baseline for LAU delineation and an initial estimate of lynx habitat. As new information about lynx habitat or additional site specific information becomes available it is expected these estimates will be adjusted over time and updates to lynx habitat maps and area will occur.

The 2013 LCAS presents new information on the conservation of lynx. The Targhee portion of the Caribou-Targhee is considered a secondary area. In secondary areas it recommends the focus on managing forest structure to support snowshoe hare prey resources for individual lynx that infrequently may move through or reside temporarily in the area. The identification of vegetation that contributes to lynx reproduction and survival may not be necessary on the Targhee National Forest as a secondary area. This information may serve to inform future updates or refinements to LAU delineations and updates to the Targhee Forest Plan.

Linkage Areas

The NLMRD provides direction and management standards and guidelines for lynx linkage areas. Lynx linkage areas are intended to maintain connectivity and allow for movement of animals between blocks of habitat and that are otherwise separated by intervening non-habitat areas such as non-forested basins, valleys and agricultural lands or where habitat naturally narrows due to topographic features. The NRLMD identified lynx linkage areas and coarsely mapped them at a broad scale. These are displayed on Figure 1-1 of the NRLMD. Primarily identified to areas where potential highway crossing could be considered during highway and forest highway construction. Additionally, some identified linkage areas provide connectivity to other lynx habitat. There is very limited site-specific information to determine where linkage areas should be on the Targhee National Forest. Until more information becomes available linkage areas were determined to be all lands that do not fall within lynx habitat in an LAU. These areas will be considered linkage areas and are subject to the linkage objectives, standards, and guidelines. They are also subject to "All Management Practices and Activities (ALL)" objectives, standards, and guidelines.

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Classification of Forest Habitat Types for Lynx Habitat on the Targhee National Forest

Forest Habitat Types of Eastern Idaho-Western Wyoming (Steele et. al. 1983)		Lynx Habitat Type - Appendix B NRLMD EIS	Remarks
Common Name	**Scientific Name**		
limber pine/Idaho fescue	PIFL2/FEID	Dry Forest Habitat Type	Fire Group 1 - (Bradley et. al. 1992)
limber pine/Idaho fescue-Idaho fescue	PIFL2/FEID-FEID	Dry Forest Habitat Type	Fire Group 1 - (Bradley et. al. 1992)
limber pine/curl-leaf mountain mahogany	PIFL2/CELE3	Dry Forest Habitat Type	Fire Group 1 - (Bradley et. al. 1992)
limber pine/common juniper	PIFL2/JUCO6	Dry Forest Habitat Type	Fire Group 1 - (Bradley et. al. 1992)
limber pine/spike fescue	PIFL2/LEKI2	Dry Forest Habitat Type	Fire Group 1 - (Bradley et. al. 1992)
Douglas-fir/Idaho fescue	PSME/FEID	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/Idaho fescue-Idaho fescue	PSME/FEID-FEID	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/mallow ninebark	PSME/PHMA5	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/mallow ninebark-Douglas-fir	PSME/PHMA5-PSME	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/mallow ninebark-Oregon boxleaf	PSME/PHMA5-PAMY	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/mountain ninebark	PSME/PHMO4	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/thinleaf huckleberry	PSME/VAME	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/thinleaf huckleberry-thinleaf huckleberry	PSME/VAME-VAME	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/common snowberry	PSME/SYAL	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/common snowberry-common snowberry	PSME/SYAL-SYAL	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/pinegrass	PSME/CARU	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/pinegrass-pinegrass	PSME/CARU-CARU	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/pinegrass-Idaho fescue	PSME/CARU-FEID	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/white spirea	PSME/SPBE2	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/white spirea-white spirea	PSME/SPBE2-SPBE2	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/white spirea-pinegrass	PSME/SPBE2-CARU	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/common juniper	PSME/JUCO6	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/heartleaf arnica	PSME/ARCO9	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/heartleaf arnica-heartleaf arnica	PSME/ARCO9-ARCO9	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)

Forest Habitat Types of Eastern Idaho-Western Wyoming (Steele et. al. 1983)		Lynx Habitat Type - Appendix B NRLMD EIS	Remarks
Common Name	**Scientific Name**		
Douglas-fir/heartleaf arnica/timber milkvetch	PSME/ARCO9/ASMI9	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/sweetcicely	PSME/OSBE	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/mountain snowberry	PSME/SYOR2	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/curl-leaf mountain mahogany	PSME/CELE3	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/Rocky Mountain maple	PSME/ACGL	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/Rocky Mountain maple-Oregon boxleaf	PSME/ACGL-PAMY	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/creeping barberry	PSME/MARE11	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/creeping barberry-creeping barberry	PSME/MARE11-MARE11	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/creeping barberry-mountain snowberry	PSME/MARE11-SYOR2	Dry Forest Habitat Type	Fire Group 2 - (Bradley et. al. 1992)
Douglas-fir/creeping barberry-Geyer's sedge	PSME/MARE11-CAGE2	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Douglas-fir/creeping barberry-common juniper	PSME/MARE11-JUCO6	Secondary Vegetation	Fire Group 3 - (Bradley et. al. 1992)
Engelmann spruce/field horsetail	PIEN/EQAR	Primary Vegetation	
Engelmann spruce/white marsh marigold	PIEN/CALE4	Primary Vegetation	
Engelmann spruce/mallow ninebark	PIEN/PHMA5	Primary Vegetation	
Engelmann spruce/fragrant bedstraw	PIEN/GATR3	Primary Vegetation	
Engelmann spruce/twinflower	PIEN/LIBO3	Primary Vegetation	
Engelmann spruce/common juniper	PIEN/JUCO6	Dry Forest Habitat Type	Usually associated with dry upland non-forest habitats.
Engelmann spruce/grouse whortleberry	PIEN/VASC	Primary Vegetation	
Engelmann spruce/softleaf sedge	PIEN/CADI6	Primary Vegetation	
Engelmann spruce/revolute hypnum moss	PIEN/HYRE70	Primary Vegetation	
Engelmann spruce/heartleaf arnica	PIEN/ARCO9	Primary Vegetation	
Engelmann spruce/gooseberry currant	PIEN/RIMO2	Primary Vegetation	
subalpine fir/red baneberry	ABLA/ACRU2	Primary Vegetation	
subalpine fir/mallow ninebark	ABLA/PHMA5	Primary Vegetation	
subalpine fir/common snowberry	ABLA/SYAL	Primary Vegetation	

Forest Habitat Types of Eastern Idaho-Western Wyoming (Steele et. al. 1983)		Lynx Habitat Type - Appendix B NRLMD EIS	Remarks
Common Name	**Scientific Name**		
subalpine fir/western meadow-rue	ABLA/THOC	Primary Vegetation	
subalpine fir/claspleaf twistedstalk	ABLA/STAM2	Primary Vegetation	
subalpine fir/claspleaf twistedstalk-claspleaf twistedstalk	ABLA/STAM2-STAM2	Primary Vegetation	
subalpine fir/Rocky Mountain maple	ABLA/ACGL	Primary Vegetation	
subalpine fir/Rocky Mountain maple-Oregon boxleaf	ABLA/ACGL-PAMY	Primary Vegetation	
subalpine fir/bluejoint	ABLA/CACA4	Primary Vegetation	
subalpine fir/bluejoint-bluejoint	ABLA/CACA4-CACA4	Primary Vegetation	
subalpine fir/bluejoint/dwarf bilberry	ABLA/CACA4/VACA13	Primary Vegetation	
subalpine fir/bluejoint/western Labrador tea	ABLA/CACA4/LEGL	Primary Vegetation	
subalpine fir/twinflower	ABLA/LIBO3	Primary Vegetation	
subalpine fir/twinflower-twinflower	ABLA/LIBO3-LIBO3	Primary Vegetation	
subalpine fir/twinflower/grouse whortleberry	ABLA/LIBO3/VASC	Primary Vegetation	
subalpine fir/rusty menziesia	ABLA/MEFE	Primary Vegetation	
subalpine fir/rusty menziesia-rusty menziesia	ABLA/MEFE-MEFE	Primary Vegetation	
subalpine fir/common beargrass	ABLA/XETE	Primary Vegetation	
subalpine fir/common beargrass/thinleaf huckleberry	ABLA/XETE/VAME	Primary Vegetation	
subalpine fir/common beargrass/grouse whortleberry	ABLA/XETE/VASC	Primary Vegetation	
subalpine fir/broadleaf arnica	ABLA/ARLA8	Primary Vegetation	
subalpine fir/creeping barberry-creeping barberry	ABLA/MARE11-MARE11	Primary Vegetation	
subalpine fir/creeping barberry	ABLA/MARE11	Primary Vegetation	
subalpine fir/creeping barberry-Geyer's sedge	ABLA/MARE11-CAGE2	Primary Vegetation	
subalpine fir/white spirea	ABLA/SPBE2	Primary Vegetation	
subalpine fir/sickletop lousewort	ABLA/PERA	Primary Vegetation	
subalpine fir/thinleaf huckleberry	ABLA/VAME	Primary Vegetation	
subalpine fir/thinleaf huckleberry/grouse whortleberry	ABLA/VAME/VASC	Primary Vegetation	

Forest Habitat Types of Eastern Idaho-Western Wyoming (Steele et. al. 1983)		Lynx Habitat Type - Appendix B NRLMD EIS	Remarks
Common Name	**Scientific Name**		
subalpine fir/thinleaf huckleberry/Oregon boxleaf	ABLA/VAME/PAMY	Primary Vegetation	
subalpine fir/thinleaf huckleberry-thinleaf huckleberry	ABLA/VAME-VAME	Primary Vegetation	
subalpine fir/grouse whortleberry	ABLA/VASC	Dry Forest Habitat Type	Supports a persistent lodgepole pine community type. Typically associated with rhyolotic soils. (Despain 1990, McDaniel and McKelvey 2004b)
subalpine fir/grouse whortleberry/pinegrass	ABLA/VASC/CARU	Dry Forest Habitat Type	Supports a persistent lodgepole pine community type. Typically associated with rhyolotic soils. (Despain 1990, McDaniel and McKelvey 2004b)
subalpine fir/grouse whortleberry-grouse whortleberry	ABLA/VASC-VASC	Dry Forest Habitat Type	Supports a persistent lodgepole pine community type. Typically associated with rhyolotic soils. (Despain 1990, McDaniel and McKelvey 2004b)
subalpine fir/grouse whortleberry/whitebark pine	ABLA/VASC/PIAL	Dry Forest Habitat Type	Supports a persistent lodgepole pine community type. Typically associated with rhyolotic soils. (Despain 1990, McDaniel and McKelvey 2004b)
subalpine fir/common juniper	ABLA/JUCO6	Primary Vegetation	
subalpine fir/pinegrass	ABLA/CARU	Primary Vegetation or Dry Forest Habitat Type	Supports a persistent lodgepole pine community type. Typically associated with rhyolotic soils. (Despain 1990, McDaniel and McKelvey 2004b)
subalpine fir/pinegrass-pinegrass	ABLA/CARU-CARU	Primary Vegetation or Dry Forest Habitat Type	Supports a persistent lodgepole pine community type. Typically associated with rhyolotic soils. (Despain 1990, McDaniel and McKelvey 2004b)
subalpine fir/pinegrass-Oregon boxleaf	ABLA/CARU-PAMY	Primary Vegetation	
subalpine fir/sweetcicely	ABLA/OSBE	Primary Vegetation	
subalpine fir/sweetcicely-Oregon boxleaf	ABLA/OSBE-PAMY	Primary Vegetation	

Forest Habitat Types of Eastern Idaho-Western Wyoming (Steele et. al. 1983)		Lynx Habitat Type - Appendix B NRLMD EIS	Remarks
Common Name	**Scientific Name**		
subalpine fir/sweetcicely-sweetcicely	ABLA/OSBE-OSBE	Primary Vegetation	
subalpine fir/heartleaf arnica	ABLA/ARCO9	Primary Vegetation	
subalpine fir/heartleaf arnica-heartleaf arnica	ABLA/ARCO9-ARCO9	Primary Vegetation	
subalpine fir/heartleaf arnica-timber milkvetch	ABLA/ARCO9-ASMI9	Primary Vegetation	
subalpine fir/heartleaf arnica-russet buffaloberry	ABLA/ARCO9-SHCA	Primary Vegetation	
subalpine fir/heartleaf arnica-Engelmann spruce	ABLA/ARCO9-PIEN	Primary Vegetation	
subalpine fir/Geyer's sedge	ABLA/CAGE2	Primary Vegetation	
subalpine fir/Geyer's sedge-Geyer's sedge	ABLA/CAGE2-CAGE2	Primary Vegetation	
subalpine fir/Ross' sedge	ABLA/CARO5	Primary Vegetation	
subalpine fir/gooseberry currant	ABLA/RIMO2	Primary Vegetation	
subalpine fir/gooseberry currant-gooseberry currant	ABLA/RIMO2-RIMO2	Primary Vegetation	
subalpine fir/gooseberry currant-whitebark pine	ABLA/RIMO2-PIAL	Primary Vegetation	
subalpine fir/Hitchcock's smooth woodrush	ABLA/LUGLH	Primary Vegetation	
subalpine fir/Hitchcock's smooth woodrush/grouse whortleberry	ABLA/LUGLH/VASC	Primary Vegetation	
whitebark pine/grouse whortleberry	PIAL/VASC	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/Geyer's sedge	PIAL/CAGE2	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/common juniper	PIAL/JUOC	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/common juniper-russet buffaloberry	PIAL/JUCO6-SHCA	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/common juniper-common juniper	PIAL/JUCO6-JUCO6	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/Idaho fescue	PIAL/FEID	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.

Forest Habitat Types of Eastern Idaho-Western Wyoming (Steele et. al. 1983)		Lynx Habitat Type - Appendix B NRLMD EIS	Remarks
Common Name	**Scientific Name**		
whitebark pine/Ross' sedge	PIAL/CARO5	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/Ross' sedge-lodgepole pine	PIAL/CARO5-PICO	Dry Forest Habitat Type	Whitebark pine habitat types were not identified as lynx habitat.
whitebark pine/Ross' sedge-Ross' sedge	PIAL/CARO5-CARO5	Dry Forest Habitat Type	Whitebark pine habitat types were not as lynx habitat.
lodgepole pine/twinflower	PICO/LIBO3	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/thinleaf huckleberry	PICO/VAME	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/grouse whortleberry	PICO/VASC	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/white spirea	PICO/SPBE2	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/pinegrass	PICO/CARU	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/Geyer's sedge	PICO/CAGE2	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/common juniper	PICO/JUCO6	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/heartleaf arnica	PICO/ARCO9	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/Ross' sedge	PICO/CARO5	Dry Forest Habitat Type	Persistent lodgepole pine community type.
lodgepole pine/russet buffaloberry	PICO/SHCA	Dry Forest Habitat Type	Persistent lodgepole pine community type.
All stable quaking aspen types	POTR5	Dry Forest Habitat Types	All stable aspen types (Mueggler 1988).
Juniper or Bigtooth maple types	JUSC, ACGR	Non-lynx habitat	
Unclassified Douglas-fir habitat types	PSME	May be secondary or dry forest habitat types	
Unclassified subalpine fir habitat types	ABLA	Likely primary vegetation	
Unclassified limber pine habitat types	PIFL	Dry forest habitat type	
Unclassified Engelmann spruce habitat types	PIEN	Likely primary vegetation	

Photopoints of Persistent Lodepole Pine Community Types ((Dry Lodgepole Pine) on the Targhee National Forest

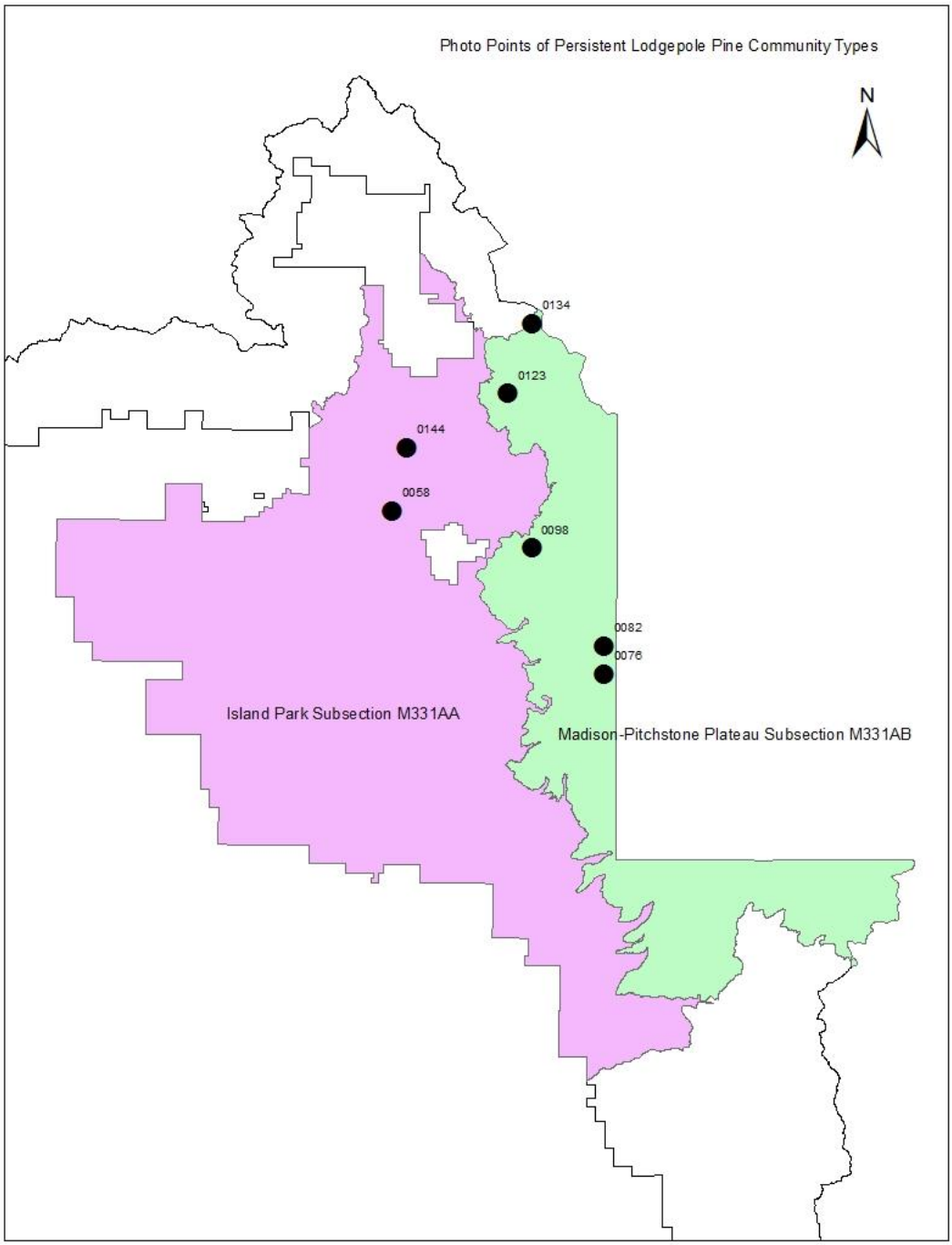

Figure 9 Map of photo points of ABLA/VASC and ABLA/CARU habitat types that are persistent lodgepole pine community types.

Figure 10 Overstory approximately 100 years old. ABLA/VASC-VASC habitat type. Madison-Pitchstone Ecological Subsection.

Figure 11 Overstory over 100 years old. ABLA/VASC-CARU habitat type. Madison-Pitchstone Ecological Subsection.

Figure 12 Overstory approximately 95 years old. ABLA/VASC - CARU habitat type. Madison-Pitchstone Ecological Subsection.

Figure 13 Overstory over 100 years old. ABLA/VASC - VASC habitat type. Madison Pitchstone Ecological Subsection.

Figure 14 Overstory over 100 years old. ABLA/VASC-CARU habitat type. Madison Pitchston Ecological Subsection.

Figure 15 Overstory over 100 years old. ABLA/VASC-VASC habitat type. Island Park Ecological Subsection.

Figure 16 Overstory approximately 80 years old. ABLA/CARU habitat type. Island Park Ecological Subsection.

Classification of Ecological Units for Lynx Habitat on the Targhee National Forest

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1000	No	Yes	No primary vegetation characteristics associated with this ecological unit. PICO community types and PSME habitat types. The PSME habitat types would qualify as secondary vegetation. Identified secondary vegetation adjacent to primary vegetation on slopes >4% where PSME/SYAL habitat types are likely to occur.
1046	No	No	No primary vegetation characteristics associated with this ecological unit. PICO community types only. No secondary vegetation attributes are found within this ecological unit.
1050	No	Yes	No primary vegetation was identified. On north facing slopes within this ecological unit ABLA/VASC and ABLA/VAGL habitat types occur. ABLA/VASC is considered a dry lodgepole pine community type. Due to proximity to other lodgpole community types the interspersed ABLA/VAGL habitat types are likely to support a persistent lodgepole pine community type.
1106	Yes	No	Primary vegetation characteristics were identified on north facing slopes (N, NE, NW). North facings slopes contain ABLA habitat types. No secondary vegetation attributes are within this ecological unit. South facing slopes are Dry Douglas-fir habitat types (PSME/BERE/SYOR2) which are in Fire Group 2 (Bradley et. al. 1992).
1110	No	No	Non-forested community types intermingled with dry lodgepole pine community types.
1112	Yes	Yes	Primary vegetation characteristics were identified on north facing slopes (N, NE, NW). Secondary vegetation attributes are found on south facing slopes.
1123	No	No	No primary or secondary vegetation was identified within this ecological unit. Although ABLA/CARU/CARU habitat type was identified, these areas are located on plains in a broad transition area from shrub/steppe zone and on the cool portion of the forested zone. The composition of community types (dry PICO/ARTRP4) and persistent lodgepole pine community types (PICO/CARU), occurs within the ABLA habitat types within this ecological unit. According to Steele et. al. 1983, the more persistent PICO/CARU community types will likely occur on the ABLA/CARU habitat types.
1124	No	No	Nonforested community types

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1125	No	No	Nonforested community types
1126	No	No	Nonforested community types
1127	No	No	Nonforested community types
1128	No	No	Nonforested community types
1129	No	No	PIFL2 and PSME/JUCO6 habitat types. These are considered dry forest habitat types. Do not meet primary or secondary vegetation attributes. There are some inclusions of PIEN/JUCO6. Based on the lack of ABLA habitat types in proximity to these sites and the overall harsh and dry sites PIEN/JUCO6 is located no primary vegetation was identified.
1130	No	No	Nonforested community types
1131	No	No	Nonforested community types
1133	No	No	PSME/ARTRV community type is located within this ecological unit. This is considered a very dry and a transitional community type bordering on nonforest community types.
1140	Yes	No	All forested vegetation within this ecological unit was considered primary vegetation. Some inclusion of the dry ABLA/CARU/CARU habitat type however, persistent lodgepole pine stands are highly unlikely within this ecological unit.
1144	Yes	No	All forested sites within this ecological unit was considered primary vegetation because only ABLA habitat types were identified within the ecological unit.
1145	No	No	Nonforested community types
1146	No	No	Nonforested community types
1147	No	No	Nonforested community types
1149	Yes	Yes	Primary vegetation was identified on north facing slopes (N, NE, NW) within this ecological unit. Based on photo interpretation it is possible that the ABLA habitat types have been overestimated. This is likely to occur on the Dubois Ranger District in the area around I-15. It is likely that the north facing slopes in this are PSME habitat types. Adjustments in primary vegetation will likely need to be done as more site specific information is available.

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1150	Yes	No	This ecological unit primarily contains the ABLA/CARU/CARU habitat types on south, east, and west facing slopes. This is the drier extent of the ABLA habitat types and is on rhylotic soils. These types of sites are likely not to develop in the multistoried structure for lynx habitat and subalpine is slow to establish (Despain 1990). Extreme south facing slopes greater than 20% slopes are identified as a Dry Douglas-fir habitat type of PSME/SYOR and not considered primary or secondary vegetation. We identified lynx habitat on ABLA/CARU sites in the Centennial mountains because it was intermixed with moist subalpine fir sites. In the Island Park area we identified these are likely to be persistent, dry lodgepole pine types. This would be consistent with Yellowstone National Park in not including these sites due to slow establishment of subalpine fir due to rhyolitic soils. Also these areas meet the characteristics described in (Bradley et. al 1992) for persistent lodgepole pine community types.
1154	No	No	No primary or secondary vegetation was identified. Dry Douglas-fir and limber pine habitat types are identified within this ecological unit.
1170	Yes	No	All primary vegetation. Left small clumps of ABLA out. Only large stands of ABLA types identified.
1172	Yes	No	Identified primary vegetation on all aspect (N, NE, NW, W, E, SE, SW) slopes except extreme south facing slopes . Extreme south Facing slopes are PSME/SYOR/BERE which are dry Douglas-fir habitat types that are not secondary vegetation.
1175	Yes	No	Identified primary vegetation on forested areas within this EUI. The stands identified are primarily border tall forb communities. Whitebark pine is likely to be intermixed within these sites.
1204	No	No	No primary or secondary vegetation was identified. Dry Douglas-fir habitat types. PSME/SYOR.
1209	Yes	No	Identified primary vegetation on all slopes < 20% and on north facing aspects (N, NE, NW) on slopes >20%. No secondary vegetation identified which is either dry Douglas-fir habitat types or nonforested areas.
1216	Yes	No	Identified primary vegetation on all aspects except extreme south facing slopes (N, NE, NW, W, E, SE, SW. Extreme south facing slopes are PSME/SYOR and PSME/BERE.
1219	Yes	No	Identified primary vegetation on North Facing aspects (N, NE, NW). South facing aspects are dry Douglas-fir habitat types.
1222	Yes	Yes	Identified primary vegetation on on all aspects except south facing (S, SE, SW). Secondary vegetation occurs on south facing slopes.

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1224	Yes	No	Identified primary vegetation on North Facing aspects (N, NE, NW). South facing aspects are dry Douglas-fir habitat types.
1225	No	No	No primary or secondary vegetation identified. This ecological unit consist of PIAL and ABLA/VASC habitat types. The ABLA/VASC habitat types in this are considered dry climax lodgepole pine community types.
1228	No	No	No primary or secondary vegetation identified. There may be isolated pockets of primary vegetation on some north facing slopes in this ecological unit but are very limited and intermingled with climax lodgepole pine and secondary vegetation.
1230	No	Yes	No primary vegetation identified. This ecological consist mainly of secondary vegetation.
1250	No	No	No primary or secondary vegetation identified. Ecological unit primarily consist of dry Douglas-fir habitat types.
1270	Yes	No	All the forested vegetation was identified as primary vegetation within this ecological unit.
1280	No	No	Ecological unit consist primarily of nonforested lands.
1294	No	Yes	No primary vegetation identified. Secondary vegetation occurs on north facing slopes within this ecological unit.
1303	Yes	No	Primary Vegetation identified on north, east, and west facing slopes (N, NE, NW, E, and W). No secondary vegetation identified. South facing slopes primarily dry Douglas-fir habitat types which may have some isolated areas of Subalpine fir habitat types.
1307	Yes	No	Primary vegetation was identified on all aspects that are forested.
1313	No	No	No primary or secondary vegetation identified. Ecological unit is primarily nonforested areas and dry Douglas-fir habitat types.
1315	Yes	Yes	Primary vegetation was mapped on North, West and East facing slopes (N, NE, NW, E, and W). Some secondary vegetation may be found on south facing slopes.
1316	Yes	No	All the forested vegetation was identified as primary vegetation within this ecological unit.
1331	No	No	No primary or secondary vegetation identified. Ecological unit primarily consist of nonforest types. There is some forested areas, however they are very marginal and consist primarily of krummholz.
1332	No	No	No primary or secondary vegetation identified. Ecological unit consist primarily of nonforested areas. There is some incidental forested types on north facing slopes that may be marginal subalpine types.

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1333	No	No	No primary or secondary vegetation identified. Ecological units consist primarily of nonforested areas. There are some incidental forest types on north facing slopes that are majority of secondary vegetation with some primary vegetation.
1400	No	No	No primary or secondary vegetation identified. Consist primarily of nonforested types with dry lodgepole types.
1401	No	No	Ecological unit consist primarily of nonforested lands.
1414	Yes	No	Some primary vegetation was mapped in the denser forested areas of this ecological unit. The majority of the forested vegetation is open whitebark pine stands on very harsh sites. In the ABLA/VASC/PIAL habitat type whitebark pine tends to be persistent. Whitebark pine is not one of the primary cover types that lynx are associated with.
1430	No	No	This ecological unit consist mainly of dry Douglas-fir habitat types. No primary or secondary vegetation identified.
1505	No	No	Ecological unit consist primarily of nonforested lands.
1506	Yes	Yes	Ecological unit consist primarily of secondary vegetation characteristics (cool moist Douglas-fir habitat types). Primary vegetation was identified on North (N, NE, NW) facing aspects on slopes greater than 25 percent. Primary vegetation is very limited in this ecological unit.
1507	Yes	No	Minor amounts of primary habitat was identified on North (N, NE, NW) facing slopes. Ecological unit primarily consist of nonforested types or drier forested habitat types.
1516	Yes	No	Identified primary vegetation on North Facing aspects (N, NE, NW) which primarily consist of ABLA/VAGL habitat types. On all other aspects ABLA/VASC/CARU habitat types occur. This habitat type is likely to support a persistent dry lodgepole community type which is not considered lynx habitat.
1570	No	No	No primary or secondary vegetation identified. This ecological unit consist of PIAL and ABLA/VASC habitat types. The ABLA/VASC habitat types in this are considered dry climax lodgepole pine community types. PIAL habitat types are not considered primary or secondary vegetation.
1573	No	No	No primary or secondary vegetation identified. This ecological unit consist of PIAL and ABLA/VASC habitat types. The ABLA/VASC habitat types in this are considered dry climax lodgepole pine community types. PIAL habitat types are not considered primary or secondary vegetation.

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1575	Yes	No	Primary vegetation was identified on North (N, NE, NW) facing slopes. These slopes primarily consist of ABLA/VAGL habitat types. On all other slopes ABLA/CARU occurs. In the Island Park area ABLA/CARU is likely to be a persistent lodgepole pine type. The primary vegetation identified in this ecological unit is on the driest extent of the ABLA/VAGL habitat type and likely would maintain a persistent lodgepole pine community type.
1576	Yes	No	Primary vegetation was identified on North and East (N, NE, NW, E) facing slopes. PIAL habitat types occur on all other slopes. PIAL habitat types are not identified as primary or secondary vegetation.
1585	No	No	No primary or secondary vegetation identified. This ecological unit consist of ABLA/VASC habitat types. The ABLA/VASC habitat types in this are considered dry climax lodgepole pine community types.
1592	No	Yes	No primary vegetation identified. Ecological unit primarily consist of cool, moist Douglas-fir habitat types that are considered secondary vegetation.
1593	Yes	No	Primary vegetation was identified on all aspects that are forested.
1594	Yes	Yes	Primary vegetation was identified on all aspects except extreme south (S) facing aspects. Secondary vegetation is found on South facing aspects.
1595	Yes	No	Primary vegetation was identified on all aspects except on south (S, SE, SW) facing slopes greater than 30% slope. On the south slopes Dry Douglas-fir habitat types occur which is not secondary vegetation.
1597	Yes	No	Primary vegetation was identified on all aspects. No secondary vegetation occurs in this ecological unit.
1600	Yes	No	Primary vegetation was identified on all aspects.
1646	Yes	No	Primary vegetation was identified on all aspects.
1700	No	No	No primary or secondary vegetation identified in this ecological unit. The ABLA/VASC habitat types in this are considered dry climax lodgepole pine community types.

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
1720	Yes	No	Ecological consist of dry climax lodgepole pine community types with the drier extreme of the ABLA/VAGL habitat types. Where the ecological unit is within the Island Park or Madison-Pitchstone ecological subsection no primary vegetation was identified. This ecological unit is surrounded by dry climax lodgepole pine areas and within this ecological unit dry lodgepole pine community types are interspersed within it. Even within the ABLA/VAGL habitat type, the dry lodgepole pine community types currently exist. Not mapping this as primary vegetation would be consistent with the findings and research completed by McKelvey and McDaniel 2004. In the Centennial subsection all of the ecological unit was identified as primary vegetation since it is surrounded by ABLA habitat types.
1730	No	No	No primary or secondary vegetation identified. This ecological unit consist of ABLA/VASC habitat types. The ABLA/VASC habitat types in this are considered dry climax lodgepole pine community types.
1760	No	No	No primary or secondary vegetation identified. Ecological unit consist of dry Douglas-fir habitat types and nonforested areas.
1970	Yes	No	Primary vegetation was identified on north (N, NE, NW) facing aspects. All other aspects are nonforested or dry Douglas-fir habitat types.
1999	Yes	Yes	Primary vegetation was identified next to drainages and north facing slopes primarily.
2000	No	No	Nonforested community types
2020	No	No	Nonforested community types
2040	No	No	Ecological unit dominated by climax lodgepole pine community types. Minor amounts of ABLA habitat types may be dispersed in the wettest riparian areas.
2604	No	No	Ecological unit primarily cottonwood community types and nonforest areas.
2606	No	No	Ecological unit primarily nonforested community types.
2608	No	No	Ecological unit primarily nonforested community types.
2609	Yes	No	Some primary vegetation was identified. Primarily Engelmann spruce habitat types in riparian areas.
3000	No	No	Nonforested community types.
4028	No	No	Nonforested community types.
4029	No	No	Nonforested community types.
4030	No	No	Nonforested community types.

EUI Map Symbol	Primary Vegetation	Secondary Vegetation	Remarks
4057	No	No	Nonforested community types.
4064	No	No	Nonforested community types.
4076	No	No	Nonforested community types.
4120	No	No	Nonforested community types.
4138	No	No	Nonforested community types.
4139	No	No	Nonforested community types.
4140	No	No	Nonforested community types.
4301	No	No	Nonforested community types.
4302	No	No	Nonforested community types.

Defined Aspects	
Aspect	Degrees
North	0 - 22.5
Northeast	22.5 - 67.5
East	67.5 - 112.5
Southeast	112.5 - 157.5
South	157.5 - 202.5
Southwest	202.5 - 247.5
West	247.5 - 292.5
Northwest	292.5 - 337.5
North	337.5 - 360

GIS Layers

Caribou-Targhee Corporate Layers

GeosciT_TargEcozonesEUI – Targhee ecological zones as illustrated in the EUI (tnf_ecozones)
GeosciT_Subsectns – Targhee subsections (updated version after plan revision 1997) (tnf_subsectns)

WaterCT_HUC5_2009 – HUC5 layer derived from ct_wsh2009_83 * use this layer for HUC 5 watersheds * (ct09_huc5
WaterCT_HUC6_2009 – HUC6 layer derived from ct_wsh2009_83 * use this layer for HUC 6 watersheds * (ct09_huc6)
WaterCT_Hydro – C-T stream layer; cff data; 12/2010; designates perennial, intermittent, etc; no stream names
(ct_hydro_83)

Transportation – feature dataset; most current transportation layer for CaribouTarghee, rds/trls in one layer
"TravelRoute_ln" **use "TravelRoute_ln" feature class for transportation needs starting 2011; read the metadata to understand the new attributes in this layer; ((metadata .doc file also located in ref\library\gis\r04_ctf\Metadata\Transportation)). Use trav_2012 column attributes for most needs** This replaces the individual transportation layers for Targhee, Caribou, and Curlew

LandCT_Owners2010 - updated Caribou-Targhee ownership as of 2010; includes Curlew National Grassland

LandCT_Bnd - Caribou-Targhee forest boundary

2011 National Agricultural Imagery Program (NAIP) Imagery by County
1:24000 Digital Raster Graphic (DRG) USGS Topographic Quads
Digital Elevation Model (DEM) 10 meter

Derived Layers

LynxGA1.shp – Map segments derived from draft existing vegetation mapping in Geographic Area 1.
LynxGA2.shp – Map segments derived from draft existing vegetation mapping in Geograhic Area 2.
LynxGA3.shp – Map segments derived from draft existing vegetation mapping in Geographic Area 3.

Attributes:

Primary- If primary = "yes" map segment identified as primary vegetation, if null map segment not identified as primary vegetation.

Secondary – If secondary = "yes" map segment identified as secondary vegetation, if null map segment not identified as secondary vegetation.

DraftPrimSecHab2013.shp - Derived by merging LynxGA1.shp, LynxGA2.shp, and LynxGA3.shp where Primary = "yes" and Secondary = "yes".
Added additional attribute vegclassha. Where "primary" = primary vegetation and "secondary" = secondary vegetation. Derived where primary or secondary = "yes" on the merged attribute table.

DraftPrimSecHab2013Ownership.shp – Primary and secondary vegetation on Targhee National Forest. Potential lynx habitat identified to derive LAU boundaries. Derived by intersecting **LandCT_Owners2010** with **DraftPrimSecHab2013.shp.** Added additional attribute lynxhab and site_id. Where lynxhab= "yes" potential lynx habitat has been identified. Patch sizes of primary and secondary vegetation >= 5 acres. This was derived from GIS processes. Dissolved **DraftPrimSecHab2013Ownership.shp** on vegclassha = "primary or secondary" resulted in **DissolveDraftPrimOwnership2013.shp.** To derive patches less than 5 acres break coverage into parts by making multipart part shapes into single part shapes using Xtools process. Resulted in coverage **DissolveDraftPrimOwnership2013Parts.shp.** Deleted parts <=5 acres. Used this coverage overlaid and selected polygons in **DraftPrimSecHab2013Ownership.shp** and attributed selected polygons with lynxhab = "yes". Where lynxhab is null polygons are less than 5 acres and size and too small to qualify as lynx habitat. site_id is an numerical identifier of map unit polygons. This can be used in project level analysis to track changes in identifying and classifying lynx habitat.

DraftLAUTarghee.shp – Draft LAU's for the Targhee National Forest. Derived by using **WaterCT_HUC5_2009**, **WaterCT_HUC6_2009**, **WaterCT_Hydro**, **Transportation**, **and LandCT_Owners2010** corporate layer topology. LAU's were created based on the criteria in the NLMRD and LCAS. Attributes LAUNumber = numerical identifier of LAU. Values range from 1 to 24. launame = values are text attribute and name of LAU based on the majority watershed or drainage name.

DraftLAULynxHabTarghee.shp – Lynx habitat within LAU's. Derived from intersecting **DraftPrimSecHab2013Ownership.shp** with **DraftLAUTarghee.shp**. To remove polygons less than 5 acres lynxhab = "yes". veglaclassha is attributed if the lynx habitat is composed of primary or secondary vegetation.